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ANNUAL REPORT

OF THE

Department of Agriculture

OF THE

PROVINCE OF ONTARIO

1907

VOL. I.

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
Printed by L. K CAMERON, Printer to the King's Most Excellent Majesty
1908.

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CONTENTS

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VOLUME I.

Report of the Agricultural College and Experimental Farm.

Report of the Agricultural and Experimental Union.

Reports of the Dairymen's Associations and Dairy Schools.

Report of the Agricultural Societies.

Report of the Horticultural Societies.

Report of the Bureau of Industries, (Agricultural Statistics.)

VOLUME II.

Report of the Fruit Growers' Association.

Report of the Fruit Experiment Stations.

Report of the Vegetable Growers' Association.

Report of the Bee-Keepers' Association.

Report of the Entomological Society.

Report of Farmers' Institutes of Ontario, Parts I. and II.

Report of the Women's Institutes.

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THIRTY-THIRD ANNUAL REPORT

OF THE

Ontario Agricultural College

AND

Experimental Farm

1907

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO)

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO
Printed by L. K. CAMERON, Printer to the King's Most Excellent Majesty
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TORONTO.

To the Honourable SIR WILLIAM MORTIMER CLARK, K.C.,
Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the pleasure to present herewith for the consideration of your Honour the Report of the Ontario Agricultural College for 1907.

Respectfully submitted,

NELSON MONTEITH,

Minister of Agriculture.

TORONTO, 1908.

THE ONTARIO AGRICULTURAL COLLEGE, GUELPH, ONT.

Hon. Nelson Monteith, *Minister of Agriculture* *Toronto, Ont.*

FACULTY OF INSTRUCTION, 1908.

G. C. Creelman, B.S.A., M.S	President.
H. H. Dean, B.S.A	Professor of Dairy Husbandry.
C. A. Zavitz, B.S.A	Professor of Field Husbandry.
J. Hugo Reed, V.S	Professor of Veterinary Science.
H. L. Hutt, B.S.A	Professor of Landscape Gardening.
G. E. Day, B.S.A	Professor of Animal Husbandry.
J. B. Reynolds, B.A	Professor of English.
R. Harcourt, B.S.A	Professor of Chemistry.
John Evans	Professor of Manual Training.
S. B. McCready, B.A	Professor of Botany and Nature Study.
S. F. Edwards, M.Sc	Professor of Bacteriology.
C. J. S. Bethune, M.A., D.C.L	Professor of Entomology and Zoology.
W. R. Graham, B.S.A	Professor of Poultry Husbandry.
W. P. Gamble, B.S.A	Professor of Soil Chemistry.
H. R. Rowsome	Lecturer in Apiculture.
T. D. Jarvis, B.S.A	Lecturer in Entomology and Zoology.
W. H. Day, B.A	Lecturer in Physics.
John Buchanan, B.S.A	Lecturer in Field Husbandry.
E. J. Zavitz, B.A., M.S.F	Lecturer in Forestry.
J. W. Crow, B.S.A	Lecturer in Horticulture.
R. W. Wade, B.S.A	Lecturer in Animal Husbandry.
B. Barlow, B.S	Lecturer in Bacteriology.
H. H. LeDrew, B.S.A	Lecturer in Economics.
E. W. Kendall	Demonstrator in Manual Training.
H. L. Fulmer, B.S.A	Demonstrator in Chemistry.
J. W. Eastham, B.S	Demonstrator in Botany.
J. E. Howitt, M.S.A	Demonstrator in Botany.
C. C. Thom, B.S.A	Demonstrator in Physics.
W. Hunt	Instructor in Floriculture.
R. W. Stratton	Demonstrator on Cream Separators and in Buttermaking.
G. R. Taylor	Demonstrator in Milk Testing.
C. H. Ralph	Demonstrator in Cheese Making.
Edith C. Dwight, B.A	Instructor in French and German, Acting Librarian.
R. R. Graham, B.A	Dean of Residence and Instructor in English.
Miss M. A. Purdy	Demonstrator in Chemistry.
M. F. Coglan, B.S.A	Fellow in Chemistry.
W. R. Reeds	Instructor in Athletics.

Macdonald Institute.

Miss M. U. Watson	Director of Home Economics.
Annie Ross, M.D.	Instructor in Physiology, Home Nursing, Psychology, and Child Study.
Miss Helen Given	Instructor in Domestic Science.
Miss Grace Greenwood	Instructor in Normal Methods.
Miss Rosemina Greist	Instructor in Domestic Art.
Miss Edna Ferguson	Demonstrator in Domestic Science.
Miss Evelyn Allan	Demonstrator in Laundry and Household Administration.
Miss Ethel Fonda	Demonstrator in Domestic Art.
Captain Clark	Instructor in Drill and Gymnastics.

Office Staff.

S. Springer	Bursar.
J. B. Fairbairn	Secretary.

Physician.

W. O. Stewart, M.D.

ONTARIO AGRICULTURAL COLLEGE
AND
EXPERIMENTAL FARM
FOR THE YEAR 1907.

To the Honorable the Minister of Agriculture:

Sir,—I have the honor to transmit herewith the thirty-third annual report of the Ontario Agricultural College and Experimental Farm, including the report of the Macdonald Institute.

The following is a brief review of the work contained in this report:—

PAGE.

Part I. The Report of the President 7
  Changes in the Staff, 7—Home Economics, 8—Stock Judging at Chicago, 9—Excursions, 9—Graduating Class, 10—Buildings erected during 1907, 11—Students, 12—First-class men, 14—Agriculture in our High Schools, 14—Scholarships, etc., 14—Dairy School Certificates, 15— Financial Statement, 15.

Part II. Report of the Dean of Residence 21

Part III. Report of the Professor of English 22

Part IV. Report of the Lecturer in Physics 24
  Instruction, 24—Weather Report, 24—Damage by Lightning, 26—Drainage Surveying, 27—Investigations, 40.

Part V. Report of the Professor of Botany 41
  New Equipment, 41—Troublesome Weeds of the Year, 42—New Weeds, 42—Importation of Weed Seeds from the Western Provinces, 46—Injurious Fungous Diseases of 1907, 48,—The Herbarium, 49.

Part VI. Report of the Professor of Entomology and Zoology 52
  Instruction, 52—Correspondence, 53—Remarkable Outbreak of Cutworms, 54—Spraying to kill Mustard, 55—Publications, 56—Field Experiments, 56—Destroying Asparagus Beetles, 57—Bandaging for Codling Worms, 57—Oyster Shell Scale, 58—Hydro-cyanic Acid Gas, 58—Fall Fairs, 60—The Insectary, 62—Entomological Society of Ontario, 63.

Part VII. Report of the Professor of Chemistry 64
  Teaching, 64—Miscellaneous Work, 65— Water Analysis, 68—Fertilizers for Sugar Beets, 68—Tomato Refuse, 69— Determining Moisture in Butter, 70—Milling and Flour Testings, 72—Potatoes, 76—Incubation of Eggs, 77—Breakfast Foods, 77—Uncompleted Work, 80.

Report of the Lecturer in Chemistry and Geology 81
  Teaching, 81—Ash Constituents of Beet Pulp, 81—Ash Constituents of Cereals, 85—Condimental and Stock Foods, 89—Commercial Feed Stuffs, 92.

Part VIII. Report of the Professor of Veterinary Science 95

Part IX. Report of the Professor of Dairy Husbandry 97
  Teaching, 98—Official Testing of Cows, 98—Testing samples of Milk and Cream, 99—An excellent Cow Record, 100—Determining Moisture in Dairy Products, 100—Experiments in Butter-making, 104—Experimental Shipments of Butter to England, 104—Different Methods of Increasing the moisture content of Butter, 115—Experiments in Cheese-making, 120—Pasteurizing of Milk for Cheese-making, 120—Recovering more of Milk Solids in Cheese-making, 121—Methods of cutting Curd from over-ripe Milk compared, 123—Moisture in Curd and Cheese, 125—Acidity of Curd at Salting, 129.

Part X. Report of the Professor of Bacteriology 131
  Instruction, 131—Laboratory Work and Analyses, 132—Research, 133.

Part XI. Report of the Professor of Horticulture 135
  Horticulture on the College Curriculum, 135—Horticultural Development in Ontario, 135—Outline of Work in Horticultural Department, 136—Fruit-growing, 137—Plant Breeding, 137—Cover

PAGE.

Crops, 138—Orchard Fruits, 138—Sterility and Partial Fertilization of Apple Blossoms, 141—Vegetable Gardening, 143—Heaviest Yielding Tomatoes, 145—Forcing House Experiments, 145—Sub-irrigation and Surface Watering, 147—Floriculture, 148—Teaching and Demonstration Work, 148—Judging at Horticultural Societies' Exhibits and Fall Fairs, 149—Fumigation with Cyanide of Potassium for White-fly, 150—The Flower Beds and Borders, 152—Landscape Gardening and Rural Art, 153—Beautifying of School Grounds, 153—The College Grounds, 154.

PART XII. REPORT OF THE PROFESSOR OF ANIMAL HUSBANDRY AND SUPERINTENDENT. 155
Farm Crops, 155—Investigations with Swine, 155—Fattening Steers for Export, 157—Shortkeep *vs* Longkeep, 157—Feeding Steers loose *vs.* tied, 160—Live Stock, 161—A remarkable Milk record, 161—The Dairy Herd, 162.

PART XIII. REPORT OF THE PROFESSOR OF FIELD HUSBANDRY 165
Views of Experimental Plots, 166—Experimental Work, 168—Weather conditions in 1907, 170—Farm Crops in Ontario, 172—Ontario Agricultural and Experimental Union, 175—Improvement of Farm Crops, 176— Different Dates of Seeding, 177—Quantity of Seed per acre, 178—Preparation of land for Winter Wheat, 178—The best time to cut Winter Wheat, 179—Treatment of Grain for Smut, 179—Seed Mixtures for Grain production, 181—Oats, 185—Barley, 188—Wheat, 190—Rye, 194—Corn, 195—Buckwheat, 196—Flax, 196—Millet, 197—Sorghum, 197—Sunflowers, 197—Field Peas, 197—Beans, 198—Cow Peas, 199—Grass Peas, 199—Vetches, 199—Potatoes, 200—Mangels, 202—Sugar Beets, 204—Turnips, 207— Kohl Rabi, 207—Carrots, 207— Parsnips, 208—Corn for Fodder and the Silo, 209—Sorghum for Fodder, 212—Sunflowers for Fodder, 214—Millet for Green Fodder and Hay, 214—Rape, Kale, Cabbage, etc., 217—Leguminous Crops for Green Fodder, 219—Red Clover, 219—Lucerne or Alfalfa, 220—Timothy, 221—Annual Pasture Crops, 222—Clovers and Grasses for Pasture, 224.

PART XIV. REPORT OF THE LECTURER IN FORESTRY 227
College Woodlots and Plantations, 227—Nurseries, 228—Co-operative Planting, 230—Waste Lands, 232.

PART XV. REPORT OF THE MANAGER OF THE POULTRY DEPARTMENT 233
Poultry Houses, 233—Trap Nests, 234—Growing Chickens, 234—Fattening Chickens, 235.

PART XVI. REPORT OF THE LECTURER IN ECONOMICS 237

PART XVII. THE DIRECTOR OF HOME ECONOMICS 239
The Normal Course, 239—Experiment in Cooking Beans, 240—Experiment in Vegetable Cooking, 242—Experiment in mixing fat into dough, 244—The Housekeeper Course, 245—The Homemaker Course, 246—Short Course in Domestic Science, 247—Short Course in Sewing, 247—Optional Courses, 248—Recipients of Certificates, 249—Attendance, 250—Staff changes, etc., 251—Equipment, etc., 251.

PART XVIII. REPORT OF PROFESSOR OF APPLIED MECHANICS 256
Power on the Farm, 258—A New Binder, 262—Normal Course in Manual Training, 262.

PART XIX. REPORT OF THE PROFESSOR OF NATURE STUDY 264
The Macdonald Scholarships, 264—Nature Study Course, 265—School Gardens, 266—Summer Class, 267—Teachers' Conventions, 267—Training of Teachers, 269—Agricultural High Schools, 275.

PART XX. REPORT OF THE LIBRARIAN 276

PART XXI. REPORT OF THE PHYSICIAN 278

INDEX 279

I have the honor to be, Sir,

Your obedient servant,

G. C. CREELMAN,
President.

GUELPH, Dec. 31st, 1907.

ONTARIO AGRICULTURAL COLLEGE

PART I.

THE PRESIDENT.

The year 1907 shows a larger attendance at the Ontario Agricultural College than ever before in its history, namely, 1,077 students in all departments. This means that the classes have been larger and the work of the professors, lecturers, demonstrators, and other officers increased. All of these persons have worked faithfully and well, and we believe that each year the Course is being materially strengthened.

Changes in the Staff.

It seems impossible to go through a year in an institution of this kind without many changes in the teaching staff of the College. A number of our young men are constantly being offered better positions eslewhere and it is only because of their loyalty to the institution and to their country that more of them do not accept tempting offers made them from different States of the American Union.

The following changes have taken place during this year:

Mr. H. S. Arkell, Lecturer in Animal Husbandry, left in June to accept the position of Professor of Animal Husbandry, in Macdonald College, St. Anne de Bellevue, Que. We feel that we are fortunate in securing as his successor here Mr. R. W. Wade, one of our own graduates, who during the past two years has been Professor of Agriculture at the State Agricultural College, Fayetteville, Arkansas.

Mr. H. S. Peart, Lecturer in Horticulture, was selected by the Department early in the year to take charge of the new Fruit Experimental Farm at Jordan Harbor. He was succeeded in the work here by another of our graduates, Mr. J. W. Crow.

Mr. G. G. White, Fellow in Chemistry, was, during the summer, appointed to a lucrative postion in the department of Chemistry and Physics in the Manitoba Agricultural College; and one of our 1907 men, Mr. M. F. Coglan, was appointed to his place here.

Mr. D. H. Jones, who so efficiently filled the position of Resident-Master for two years, resigned to go back into the Fourth Year to finish his Course. He was succeeded by Mr. R. R. Graham of the present Graduating Class.

Miss A. G. Rowsome, who for many years has been in charge of the Library and also Instructor in French and German, left to accept a larger salary at the Macdonald College in Quebec. She was succeeded by Miss E. C. Dwight, B.A., of Victoria University.

For many years we have been looking to the establishment of a department of Economics. At the beginning of the present College year such a department was organized, with Mr. H. H. LeDrew, B.S.A., in charge in the capacity of Lecturer. Mr. LeDrew is one of our most promising graduates, and has been doing special work in Economics during the last two years at the University of Chicago. He comes to us well recommended and has already aroused a good deal of enthusiasm among the students taking his work.

HOME ECONOMICS.

From year to year this department is finding more favor with the people of Ontario. Each of the Classes has been well filled and for the coming term every room in Macdonald Hall has been assigned.

We have even had to clear out the store-rooms and convert them into bed-rooms, in order to accommodate the number of students who have applied. When filled to its capacity the Hall accommodates 116 young ladies.

In the Staff two changes occurred during the year. Miss E. Bigelow, Instructor in Laundry and Household Administration, resigned and is now on the staff of the Macdonald College. Miss Bigelow was succeeded by Miss Evelyn Allan, a graduate of this year. Miss Allan has also a First-Class Teacher's Certificate from the Education Department at Toronto.

Even since Macdonald Institute opened we have had on the Curriculum a most popular Course of three months in Domestic Science. This is repeated three times each year and each Class has been well attended. During the last year there has come a demand for a similar course of instruction in Domestic Art, including sewing and millinery work. This has now been established, with Miss Greist in charge, and she has this year been supplied with an assistant in the person of Miss Ethel Fonda, and the Course is meeting with favor.

A NEW DEPARTURE.

In the department of Chemistry there has been added equipment for flour testing. Up to this time the millers of the Province have had to send samples of flour to Chicago, in order to find out the relative strength of the different grades. Now it is done here, and one of our Macdonald Institute graduates has the matter in charge under the Professor of Chemistry. So far as I can learn, the millers are well pleased with the present arrangement, and the Instructor, Miss M. A. Purdy, seems to be well fitted for her work.

COLLEGE WORK AND PROGRESS.

The work of the different departments of the College has gone on pretty much as usual during the past year. The boys' dormitory was again filled and new rooms for forty more students added this year are already spoken for after the Christmas vacation. This will mean 220 boys in Residence.

The bulletins prepared during the year by members of the College Staff and published by the Department of Agriculture are as follows:

153. "Fertilizers and Their Use," by R. Harcourt.
154. "Insecticides and Fungicides," by R. Harcourt and H. L. Fulmer.
155. "Farm Forestry," by E. J. Zavitz.
156. "Tillage and Rotation," by W. H. Day.
158. "Insects Affecting Fruit Trees," by C. J. S. Bethune.
159. "Milking Machines," by H. H. Dean and S. F. Edwards.

SHORT COURSES.

Short Courses continue to be very popular. During the past year the attendance in these Courses totalled as follows: Two Weeks' Course in Stock and Seed Judging, 302; Four Weeks' Course in Poultry Raising, 24; Three Months' Course in Dairying, 63; One Month Course in Domestic Science, 11; One Month Course in Manual Training, 15; and One Month Course in Nature Study, 30.

STOCK JUDGING AT CHICAGO.

For each of two years we have reported five students from our Senior Class as having won the trophy for judging cattle, sheep, and swine at the great International Live Stock Exposition in the city of Chicago. This had to be won three times, however, before coming into the permanent possession of any institution. It gives me the greatest possible pleasure at this time to record the fact that a new team of students again won the trophy in December and it will now occupy a permanent place in the College reading-room.

Our boys further distinguished themselves by standing first over all competitors in the Sheep Class, and second in Cattle, and second in Swine.

The names and addresses of the students composing the team are as follows:

E. S. Archibald, Wolfville, N.S.
T. R. Arkell, Arkell, Ont.
L. A. Bowes, Meaford, Ont.
R. L. Hodson, Myrtle, Ont.
D. McKenzie, Port Elgin, Ont.

EXCURSIONS.

Again the farmers came to us in large numbers during the month of June. Each day was occupied with from one to three excursions and the farmers seemed as much interested as ever in the work of the different departments.

At Macdonald Institute the women were entertained and instructed with practical demonstrations in cooking by members of the Institute Staff.

The College has also become popular as a meeting place for different organizations directly or indirectly interested in our work. During the year the following Associations held meetings here:

May 22 and 23, East Huron Teachers' Association.
June 29, American Chemical Society.
July 4 and 5, Canadian Entomological Society.
Aug. 15, Canadian Association of Master Bakers.
September. 26 and 27, N. Wellington Teachers' Association.
Oct. 3 and 4, N. Simcoe Teachers' Association.
Oct. 31 and Nov. 1, Canadian Entomological Society.

WOMEN'S INSTITUTES.

On December 11 and 12 we had again the pleasure of welcoming to the College delegates from the different Women's Institutes of the Province. The meetings this year were larger than ever, more than 500 women attending the sessions daily, and much good must result from the splendid papers read and the discussions which followed. It looks now as if something were going to be really done to materially improve the farm homes of the Province.

EXPERIMENTAL UNION.

A large number of ex-students returned to the meeting of the Experimental Union, December 9, 10, and 11. Mr. C. A. Zavitz, who has been

Secretary of the Union since it organized, had, in addition to the work of the Union, many interesting things to say in reference to his trip last year through the United States and Great Britain.

On the evening of the 10th, at the College Boys' Supper, we had the pleasure of entertaining, as the guest of the College, the distinguished President of the University of Toronto, Dr. R. A. Falconer. He delivered a stirring address before the 500 persons who sat down to supper, representing the student, staff, and graduating body. The address was heartily appreciated by all those in attendance.

GRADUATING CLASS.

Of this year's graduating class the majority are engaged in farming, and the following are the names of some of those who secured positions away from home:

AGRICULTURE.

Barton, H., Lecturer in Animal Husbandry, Macdonald College, Que.
Crow, J. W., Lecturer in Horticulture, O.A.C., Guelph.
Coglan, M. F., Fellow in Chemistry, O.A.C., Guelph.
Diaz, Pelayo, Lecturer in Agriculture, Buenos Ayres, Arg. Rep.
Hamer, R. S., Instructor in Agriculture, High School, Perth.
Hartman, W. J., Lecturer in Animal Husbandry, Bozeman, Montana.
Hart, F. C., Instructor in Agriculture, High School, Galt, Ont.
Jacobs, W. S., Professor of Animal Husbandry, Fayetteville, Arkansas.
McKenney, Angus, Instructor in Agriculture, High School, Essex.
Mills, R. W., Assistant in Experimental Department, O.A.C., Guelph.
Reed, F. H., Instructor in Agriculture, High School, Lindsay, Ont.
Sanders, G. E., Assistant in Horticultural Department, College of Agriculture, Urbana, Ill.
Scott, H.W., Farm Manager, Yardley, Pa.
Squirrel, W. J., Assistant in Experimental Dept., O.A.C., Guelph.

DOMESTIC SCIENCE.

Miss M. E. Allan, Instructor in Laundry Work and Household Administration, Macdonald Institute, O.A.C., Guelph.
Miss E. M. Burns, Teacher of Domestic Science, Public School, Ingersoll, Ont.
Miss Grace Dutcher, Housekeeper in a Settlement, Buffalo, N.Y.
Miss C. E. Elliott, Assistant in Flour Testing Department, Ogilvie Milling Co., Montreal, Que.
Miss Edith MacKenzie, Teacher of Domestic Science, Ladies' College, Halifax, N.S.
Miss Kate McLennan, Lecturer in Domestic Science, Y.W.C.A., Montreal.
Miss M. C. McManus, Teacher of Domestic Science Classes in Public and High Schools, Renfrew, Ont.
Miss N. M. Mortimer, Housekeeper in General Hospital, Vancouver, B.C.
Miss R. Murdock, Housekeeper, Presbyterian Hospital of Alleghany and Pittsburg, Alleghany, Pa.
Miss F. A. Twiss, Teacher of Domestic Science, Galt, Ont.
Miss E. Warner, Experimentalist in Bread Making, Ogilvie Milling Co., Montreal, Que.

BUILDINGS ERECTED DURING 1907.

The large addition to the Chemical Laboratory is now completed and gives facility for more and better work in that department. A number of classes from Macdonald Institute are taking practical chemistry and they are now splendidly accommodated in this new wing of the building.

The addition to the College Residence is ready for occupation and all the rooms will be filled after the Christmas vacation.

The new water tower, 100 feet high, on which is situated a water tank 20 feet high with a capacity of 50,000 gallons, was erected during the year. This gives us good water supply for all of the departments and additional fire protection for all of our buildings.

Glass houses have been built and equipped in connection with the departments of Entomology, Physics, and Botany. These should make the work in these departments still more practical and useful.

There is now in process of construction a new coal bin to hold 3,000 tons of coal. This has been almost a necessity for some time, as we have been piling our coal in large heaps on the surface up to this time, as the original coal bin soon became very much too small for our needs.

An entire new roof has been placed on the old College Residence, not before it was needed, as the old roof was leaking in many places.

OUTSIDE LECTURES.

A number of excellent lectures were delivered before the members of our student body in Massey Hall at regular intervals during the year. These lectures proved very interesting and instructive, and we are obliged to these ladies and gentlemen for the assistance they have rendered to us:

Miss H. M. Hill, Toronto, Ont.—"Travel Talk."
Mr. W. D. Hobson, Woodstock, Ont.—"Bird Lore."
Dr. A. B. McCallum, Toronto, Ont.—"Victoria Falls and Uganda."
Prof. W. A. Parks, Toronto, Ont.—"Ontario Northland, including Cobalt."
Mr. W. E. Saunders, London, Ont.—"Bird Lore."
Mr. E. S. Williamson, Toronto, Ont.—"An Evening with Dickens."
Mr. Frank Yeigh, Toronto, Ont.—"Twentieth Century Canada."
Dr. Woods, Teachers' College, Columbia University, New York—"Physical Education."

AGRICULTURE IN OUR HIGH SCHOOLS.

A significant movement in connection with agricultural education has been inaugurated this year. Your Deputy, Mr. James, the Superintendent of Education, Dr. Seath, and myself, had a number of conferences on the subject of introducing agriculture into the educational system of the Province, and it was finally decided to make the experiment in six of our high schools. Money was voted for the purpose by the Government and the schools of Perth, Morrisburg, and Lindsay in the East and Collingwood, Galt, and Essex in the West were selected. I was instructed to recommend six young men, graduates of the College, for the work, and the following received their appointments to the places named:

R. S. Hamer, Perth High School.
W. A. Munro, Morrisburg High School.
F. H. Reed, Lindsay High School.

R. E. Mortimer, Collingwood High School.
F. C. Hart, Galt High School.
A. McKenney, Essex High School.

At the annual meeting of the Experimental Union in December each of these young men made a report of the work he was attempting to do. The Minister and Deputy Minister of Agriculture were present, and they, as well as the entire audience, were impressed with the possibility of good work being done through these departments.

By arrangement with the Minister of Education and the Minister of Agriculture, I have been appointed to inspect these departments during the coming year, and I hope to have something to report later on.

STUDENTS OF THE YEAR.

ATTENDANCE.

General Course	358	
Specials in General Course Work	18	
Manual Training	29	
Dairy Courses	63	
Short Courses in Stock and Seed Judging	302	
Short Courses in Poultry Raising	24	
		794

AT MACDONALD INSTITUTE.

Domestic Science	243	
Nature Study	40	
		283
Total		1,077

There were also 124 children from the Public Schools who received instruction in Domestic Science at Macdonald Institute.

ANALYSIS OF COLLEGE ROLL (GENERAL COURSE), 1907.

From Ontario.

Brant	8	Muskoka	2
Bruce	7	Northumberland	1
Carleton	6	Norfolk	2
Dufferin	5	Nipissing	2
Dundas	2	Ontario	6
Durham	2	Oxford	7
Elgin	4	Perth	6
Essex	3	Peel	3
Frontenac	3	Prescott	2
Grey	4	Parry Sound	2
Glengarry	3	Peterboro	2
Grenville	3	Russell	2
Hastings	5	Renfrew	1
Halton	13	Simcoe	8
Haldimand	3	Stormont	1
Huron	3	Victoria	4
Kent	2	Wentworth	9
Leeds	1	Welland	6
Lanark	1	Wellington	19
Lambton	6	Waterloo	9
Lincoln	7	York	38
Lennox	2		
Middlesex	14		

From other Provinces of the Dominion.

Alberta	5	Nova Scotia	12
British Columbia	12	P. E. Island	3
Manitoba	3	Quebec	7
New Brunswick	4	Saskatchewan	3

From other Countries.

Argentine Rep	9
Belgium	1
England	29
Egypt	1
France	1
Germany	1
Ireland	3
India	2
Japan	3
Jamaica	2
Mexico	1
Scotland	8
South Africa	1
Spain	2
U. S. A.	24

AGES AND RELIGIOUS DENOMINATIONS.

The limits of age of students in the General Course, 1907, ranged from 16 to 39 years. The average age was 20.

Presbyterian	115
Methodist	100
Episcopalian	71
Baptist	33
Roman Catholic	23
Congregational	7
Friends	6
United Brethren	3
Disciple	3
No Religion	3
Hinduism	2
Unitarian	2
Mennonite	2
Dutch Reform	2
Christadelphian	1
P. Brethren	1
Quaker	1
Jewish	1

BACHELORS OF THE SCIENCE OF AGRICULTURE.

Barton, H	Vankleek Hill, Ont.
Binnie, T. H.	Bunessan, Ont.
Bower, J. E	Harriston.
Bunting, T. G	St. Catharines, Ont.
Crow, J. W.	Welland, Ont.
Coglan, M. F.	Bath, Ont.
Diaz, P	Ferrol, Spain.
Hamer, R. S.	Toronto, Ont.
Hart, F. C	Sackville, N. S.
Hartman, W. J	Woodbridge, Ont.
Hudson, H. F.	Essex, England.
Jacobs, W. S	Toronto, Ont.
McKenney, A	Corinth, Ont.
McVannel, A. P.	St. Marys.
Mills, R. W	Toronto, Ont.
Nixon, C. C.	St. George, Ont.
Prittie, F. H	Toronto, Ont.
Reed, F. H.	Georgetown, Ont.
Sanders, G. E	Roundhill, N. S.
Scott, H. W.	Lancaster, Ont.
Squirrell, W. J.	Guelph, Ont.
Twigg, C. B.	Dungannon, Ireland.
Wheeler, H. C.	Hubbard, Ohio, U.S.A

RECIPIENTS OF ASSOCIATE DIPLOMA.

Allen, R. J.	Guelph, Ont.
Angle, P. E	Forks Road, Ont.
Bell, D. T	Glanford Station, Ont.
Brownridge, J. W.	Hornby, Ont.
Campbell, A. D.	Strathroy, Ont.
Campbell, J. A.	Lawrence Station, Ont.
Campbell, M.	Zimmerman, Ont.
Coke, E. F.	Lyndhurst, Mihi Gulley, Jamaica.
Cooley, R. B.	Canifton, Ont.
Cooper, H. S.	Toronto, Ont.
Cunningham, G. C.	Oil Springs, Ont.
Cutler, G. H.	Birnam, Ont.
Diaz, G.	Ferrol, Spain.
Duff, H. C.	Dobbington.
Duffy, C.	Nauwigewauk, N. B.
Edwards, W. E. J.	Balsam, Ont.
Hamer, R. S.	Toronto, Ont.
Hebert, G.	St. Albert, Alta.
Hartman, W. J.	Woodbridge, Ont.
Hodgins, E. L.	Portage du Fort, Que.
Hoy, B	South Swansea, Mass.
Irvine, W. H.	Habermeal, Ont.
Iwanami, J.	Kofer, Japan.
Jackson, W. D.	Fulton, Ont.
James, J. L.	Argentine Republic.
Jenkinson, R. H.	Toronto, Ont.
Laughland, Jas	Hartney, Man.
Law, I. F. M.	Solina, Ont.
Lawrence, C. A.	Stratford, Ont.
LeClair, J. M.	Ste. Therese, Que.
Lewis, F. G.	Lindsay, California.
McEwen, E. F.	Byron, Ont.
McGill, H. W	Everett, Ont.
McKenzie, N. D.	Galt, Ont.
McKenzie, D	Vancouver, B. C.
McLaren, A	Edinburgh, Scotland.
McRae, D. E.	Cumberland, Ont.
Manton, G.	Eglinton, Ont.
Mills, R. W	Toronto, Ont.
Moore, R. R.	Norwich, Ont.
Oliver, D. M.	Toronto, Ont.
Palmer, B. G.	Norwich, Ont.
Palmer, W. E.	Marshville, Ont.
Ryan, W.	Surrey, England.
Shopland, N. J.	Saanich, B. C.
Sirett, H.	Rosseau, Ont.
Smye, G. C.	Ayr, Ont.
Strong, W.	Guelph, Ont.
Thompson, W. R.	London, Ont.
Treherne, R. C.	O. A. C., Guelph, Ont.
Tweltridge, T. H.	Notts, England.
Waddell, W. M.	Strathroy, Ont.
Webster, H. B.	Science Hill, Ont.

FIRST CLASS MEN.

The work of the College is divided into Departments, and all candidates who obtain an aggregate of seventy-five per cent. of the marks allotted to the subjects in any department, are ranked as first class men in that department. The following list contains the names of those who gained a first class rank in the different departments at the examinations held in April, 1907, arranged alphabetically:

First Year.

Aldwinckle, E. W., in one department, Chemistry and Physics.

Beaupre, F. C., in two departments, Chemistry and Physics, and Biology.

Christie, H. R., in two departments, English and Mathematics, Chemistry and Physics.

Faulds, T. B., in two departments, English and Mathematics and Biology.

Ferguson, C., in one department, English and Mathematics.

French, P. E., in one department, English and Mathematics.

Heurtley, E. W., in one department, English and Mathematics.

Kennedy, S., in one department, Chemistry and Physics.

LeLacheur, G., in four departments, English and Mathematics, Chemistry and Physics, Biology, and Agriculture.

Newhall, H. W., in two departments, English and Mathematics, Chemistry and Physics.

Reek, W. R., in four departments, English and Mathematics, Chemistry and Physics, Biology, and Agriculture.

Robertson, C. L., in one department, Chemistry and Physics.

Shaw, A. M., in one department, English and Mathematics.

Todd, S. E., in one department, English and Mathematics.

White, O. C., in one department, English and Mathematics.

Wilson, S., in two departments, English and Mathematics, Chemistry and Physics.

Second Year.

Allen, R. J., in one department, English and Mathematics.

Angle, P. E., in one department, English and Mathematics.

Jackson, W. D., in one department, Biology.

McEwen, C. F., in one department, English and Mathematics.

McLaren, A., in three departments, English and Mathematics, Chemistry and Physics, and Biology.

Sirett, H., in three departments, English and Mathematics, Chemistry and Physics, and Biology.

Stafford, E. W., in one department, English and Mathematics.

Strong, W., in one department, English and Mathematics.

Turney, A. G., in one department, English and Mathematics.

Webster, H. B., in two departments, English and Mathematics, Chemistry and Physics.

SCHOLARSHIPS.

Scholarships of $20 each in money were awarded for groups of subjects in first year work as follows: Highest standing with a minimum of forty per cent. of the marks for each subject, and an aggregate of seventy-five per cent. of the total number of marks allotted to the subjects in the group:

English and Mathematics.—H. R. Christie, Amherst, N.S.
Physical Science.—H. W. Newhall, Toledo, Ohio, U.S.A.
Biological Science.—W. R. Reek, Romney, Ont.

Agricultural Science.—G. LeLacheur, Murray Harbor, South, P. E. Island.

PRIZES.—SECOND YEAR.

Prizes amounting to $10 each, in books, were given as follows:

First in General Proficiency, First and Second Year work, Theory and Practice,—H. Sirett, Rosseau, Ontario.

Essay,—"Ontario as a place of residence and a sphere of livelihood".—A. G. Turney, Saventhen, Belgium.

MEDAL.—SECOND YEAR.

Governor-General's Silver Medal,—First in General Proficiency. First and Second Year work, 1906-1907.—H. Sirett, Rosseau, Ontario.

PROFESSIONAL DAIRY SCHOOL CERTIFICATES ISSUED DURING 1907.

Baxter, J. P.	Mackinac, Man.	Buttermaking.
Fockler, P.	Eganville, Ont.	Buttermaking.
McLean, Alex.	Lorneville, Ont.	Buttermaking.
Reid, Wm.	Camlachie, Ont.	Cheesemaking.

CONCLUSION.

The reports of the different departments of College work will be found further on in this volume; so that I shall not point out in detail any of the work which is being done in our laboratories and class-rooms, as this is specially outlined in the reports which follow.

I have the honor to be,

Your obedient servant,

GUELPH, Dec. 31, 1907. G. C. CREELMAN.

FINANCIAL STATEMENT, 1907.

COLLEGE DEPARTMENT.

EXPENDITURE.

Salaries and wages	$54,663 05
Meat, bread, groceries, laundry, engine room supplies and fuel	27,734 24
Advertising, printing, postage and stationery	3,951 52
Maintenance, 5 laboratories	2,992 72
Expenses, short courses	973 54
Travelling expenses and extra lectures	1,076 77
Library	2,748 91
Scholarships	90 00
Telephone service, rent, etc.	388 65
Contingencies	1,255 86
Furnishings and repairs	3,872 87
Sewage	480 00
School assessment, S. S. No. 7	89 20
Temporary assistance	977 34
Student labor	4,342 58
Total expenditure	$105,637 25
Less Revenue	24,599 23
Net expenditure	$81,038 02

REVENUE.

Board	$16,683 34
Tuition and Laboratory Fees	6,672 50
Supplemental Examinations	117 00
Rent of Post Office boxes	41 50
Fines and breakages	481 27
Rent of Rooms	144 50
Rent of Cottages	240 00
Chemical Laboratory Analyses	75 50
Sale of wood	28 50
" old carpenter shop frame	50 00
" old implement shed	50 00
" small potatoes	3 20
" meteorological supplies	11 92
Total Revenue	$24,599 23

STUDENT LABOR.

Total Per Month.		*To What Department.*	
January	$487 53	College Department	$318 85
February	355 41	Chemical Laboratory	141 62
March	321 52	Botanical Laboratory	36 55
April	164 57	Bacteriological Laboratory	17 03
May	428 61	Physical Laboratory	297 92
June	320 72	Entomological Laboratory	59 88
July	251 35	Macdonald Institute	30 11
August	214 19	Nature Study Laboratory	6 48
September	371 52	Farm Department	875 24
October	704 74	Experimental Department	713 09
November and December	722 42	Dairy Department	47 10
		Dairy School Department	23 09
		Poultry Department	655 43
		Horticultural Department	614 44
		Mechanical Department	505 75
	$4,342 58		$4,342 58

MACDONALD INSTITUTE AND HALL.

EXPENDITURE.

Salaries and wages	$13,843 00
Servants' Pay list	1,856 40
Bread, meat, groceries, furnishings, repairs, engine room supplies and fuel, and labor on grounds	11,827 46
Maintenance of laboratories in Institute	2,995 95
Library and stationery	582 78
Total Expenditure	$31,105 59
Less revenue	15,234 90
Net expenditure	$15,870 69

REVENUE.

Board	$10,802 50
Tuition and laboratory fees	4,303 50
Supplemental examinations	2 00
Sale of supplies to nature study students	14 10
Sale of supplies to manual training students	3 20
Fines and breakages	109 60
Total revenue	$15,234 90

FORESTRY DEPARTMENT.

EXPENDITURE.

Wages, trees, seeds, furnishings, repairs, etc	$3,997 26

FARM DEPARTMENT.

EXPENDITURE.

Permanent Improvements	$493 87
Wages of men and foreman	5,995 01
Purchase of Live Stock	7,164 11
Maintenance of Stock	2,559 92
Farm maintenance (including repairs, blacksmithing, binder twine, seed, furnishings, fuel, light, advertising, printing, stationery, tools, implements, etc.)	2,397 54
Contingencies	337 06
Total expenditure	$18,947 51
Less revenue	7,678 11
Net expenditure	$11,269 40

N.B.—Nothing allowed the Farm Department for the feed, etc., of the Department horses, and supplies for the College and Macdonald Hall, including milk.

REVENUE.

Sale of Cattle:		
28 Steers, 39,183 lbs. at from $5.10 to $7.50	$2,133 56	
5 Steers for	230 00	
7 Bulls for	471 55	
20 cows for	819 00	
2 Heifers for	75 00	
23 Calves for	441 50	
		$4,170 61
Sale of Pigs:		
147 Hogs, 28,827 lbs. at from 5c. to 8½c.	$1,807 01	
1 Boar	15 00	
10 Sows for	191 00	
		2,013 01
Sale of Sheep:		
8 Sheep for	$87 00	
15 Lambs for	152 05	
		239 05
Service of animals		112 00
Sale of wool, 292 lbs. at from 15½c. to 17½c.		47 83
“ one old horse		85 00
“ one old mower		10 00
“ one old seed drill		10 00
“ one load hay		5 00
“ 16 bags potatoes		8 00
Sale of Grain:		
153¾ bush. Barley at 70c.	$107 62	
19 bush. Wheat at $1.00	19 00	
3 “ Wheat at $1.25	3 75	
14 “ Oats at 50c.	7 00	
2 “ Corn at $1.00	2 00	
		139 37
Sale of 48 bags at 20c.	$9 60	
“ 20 bags at 25c.	5 00	
		14 60
Sale of Milk:		
9,978¼ qts. at 4c.	$399 14	
Sale of milk to Dairy	424 50	
		823 64
		$7,678 11

EXPERIMENTAL DEPARTMENT.

EXPENDITURE.

Permanent improvements	$599 77
Assistant, Specialist in plant breeding, stenographer, foreman, teamsters and laborers	7,259 82
Seeds, manure and special fertilizers	544 55
Furnishings, implements, repairs, blacksmithing, etc	558 17
Printing, postage, stationery, contingencies, etc.	323 68
Total expenditure	$9,285 99

DAIRY DEPARTMENT.

EXPENDITURE.

Permanent improvements	$486 56
Wages, including foreman, cheesemaker, buttermaker, engineer, stenographer and bookkeeper	2,295 00
Milk for experimental cheese and buttermaking	11,891 36
Furniture, furnishings, repairs, etc., laboratory expenses, gas chemicals, etc., and contingencies	749 11
Fuel and light	366 34
Total expenditure	$15,788 37
Less revenue	15,630 05
Net expenditure	$158 32

REVENUE.

Sale of Butter, 55,257 lbs. at from 15c to 35c	$13,566 22
" Cheese, 11,338¼ lbs. at from 5c. to 15c	1,379 39
" Cream, 2,229¼ qts. at from 15c to 30c	443 60
" Milk, 37½ qts. at 4c	1 50
" 5,334 lbs. at $1.60 cwt	85 34
" Buttermilk, 20,220 lbs. at 25c. cwt	50 55
" Sundries	3 45
Rent of House	100 00
Total revenue	$15,630 05

DAIRY SCHOOL DEPARTMENT.

EXPENDITURE.

Permanent improvements, cement floors, walks, etc	$206 23
Wages of instructors, engineer, janitor, stenographer and bookkeeper	1,605 00
Cleaning, painting, repairs and contingencies	217 65
Dairy appliances, separators, vats, expenses, cheese and butter judges inspecting factories, etc.	493 60
Advertising, printing, postage, stationery, books, papers, etc.	163 47
Fuel and light	579 40
Purchase of milk for use in school	4,275 65
Total expenditure	$7,541 00
Less revenue	3,573 73
Net expenditure	$3,967 27

REVENUE.

Fees	$92 00
Breakages	3 95
Sale of butter, 10,729 lbs. at from 23c. to 30c.	2,984 84
" Cheese, 2,852 1-3 lbs at from 8c to 15c.	368 29
" Cream, 593½ qts. at 20c.	118 70
Sundries:—Milk tests, 95c.; 1 tester pump, $5.00	5 95
Total revenue	$3,573 73

POULTRY DEPARTMENT.

EXPENDITURE.

Permanent improvements	$104 31
Wages of assistant, stenographer and temporary assistance	793 40
Furnishings and repairs	479 35
Purchase of stock	199 48
Fuel, light and contingencies	323 79
Experiments with incubator, fattening and feed	1,897 39
Total expenditure	$3,797 72
Less revenue	1,475 39
Net expenditure	$2,322 33

REVENUE.

Sale of eggs for hatching:		
2,770 eggs at from 3c. to 5c.	$132 84	
179 1-6 settings at from 75c. to $1.50	189 25	
		322 09
Sale of eggs for domestic use:		
1,683¾ doz. at from 10c. to 35c.		353 85
Sale of live poultry, 166 birds at from 50c. to $5		218 90
Sale of dressed poultry, 3,699 1-12 lbs. at from 8c. to 20c.	$450 25	
2 pair chickens for	2 10	
1 goose	1 10	
197 broilers at from 25c. to 50c.	61 20	
109 ducks at from 40c. to 50c.	53 80	
35 squabs at from 20c. to 25c.	8 35	
		576 80
Sale of feathers: 13 lbs. at from 25c. to 30c.		3 75
Total revenue		$1,475 39

HORTICULTURAL DEPARTMENT.

EXPENDITURE.

Permanent improvements	$208 58
Head gardener and foreman florist, assistant in plant breeding, assistant and night fireman, teamsters, assistant gardener, stenographer and laborers	5,758 07
Manure, trees, plants, bulbs, cold storage experiments, implements, tools and contingencies	1,499 24
Fuel and light	647 22
Wax fruit models	397 50
Purchase of horse	200 00
Total expenditure	$8,710 61
Less revenue	154 51
Net expenditure	$8,556 10

Note. Products supplied to College except when more than required.

REVENUE.

Sale of Cabbage	$7 02
Sale of Onions	13 46
Sale of Parsley	5 25
Sale of Berries	96 18
Sale of Cucumbers	29 52
Sale of Tomatoes	3 08
Total revenue	$154 51

MECHANICAL DEPARTMENT.

EXPENDITURE.

Salary of foreman	$800 00
Tools, fuel and light	145 85
Total expenditure	$945 85

SUMMARY, 1907.

———	Expenditure	Revenue	Net Expend.
College Expenditure	105637 25	24599 23	81038 02
Forestry Expenditure	3997 26	....	3997 26
Macdonald Inst. & Hall Expenditure	31105 59	15234 90	15870 69
	$140740 10	39834 13	100905 97
Farm Expenditure	18947 51	7678 11	11269 40
Experimental Expenditure	9285 99	....	9285 99
Dairy Expenditure	15788 37	15630 05	158 32
Dairy School Expenditure	7541 00	3573 73	3967 27
Poultry Expenditure	3797 72	1475 39	2322 38
Horticultural Expenditure	8710 61	154 51	8556 10
Mechanical Expenditure	945 85	....	945 85
	$65017 05	28511 79	36505 26
Total Net Expenditure, College	100905 97		
Total Net Expenditure, Farm	36505 26		
Total Net Expenditure	$137411 23		

Yours truly,

S. SPRINGER,

Bursar and Superintendent.

PART II.

THE DEAN OF RESIDENCE.

To the President of the Ontario Agricultural College:

Sir,—I have the honor to submit herewith my first report, as Dean of the Residence, for the year ending December 31st, 1907.

As I assumed the duties of Resident Master on the 1st of October of this year, I am very largely indebted to Mr. D. H. Jones, my predecessor, for the contents of this report. Much to his credit, too, I found conditions within and about the Residence most favorable for the good health, and the comfort, progress, and happiness of the students.

My duties require me to conduct roll-call and prayers, preside in the dining hall, see that the students observe study hours, and that they maintain order throughout the college halls at all times. Then, too, I see that the rooms and halls are kept clean and tidy and in good repair, and the dormitories always comfortable and congenial to study.

At present there are 171 students in the Residence. Owing to the increased attendance this year about 80 students are obliged to board outside, mainly down town, but when the new extension to the Residence is ready at Christmas time we will be able to take in about 40 of these men.

During the summer vacation the main building was repaired and improved considerably, most of the old roof was replaced by a new metal one which had been badly needed for some time; the dormitories and corridors were thoroughly cleaned and white-washed or painted, and new armchairs were provided for the students. Then, too, No. 1 classroom and the small room adjacent to it were converted into a large, cheerful, and most comfortable sittting room. Here the students spend much of their spare time in study, reading, and enjoying music and song. It certainly fills a long felt want in Residence life.

The matter of fire protection is being given increased attention. Fire extinguishers are conveniently placed throughout the halls, and have been found to be in good working order, and proved to be very efficient. The fire escapes are in good condition and red night lights are being installed in the corridors at the exits to fire escapes and stairways.

In conclusion, I must say that the character of the student body is of a very high order. The general health is good, there being throughout the year no diseases except colds, tonsilitis and la grippe. This, I believe is largely due to an increased interest in and attention to the gymnasium work by the students. They also are studious in their habits, manly in their conduct, courteous in their manners, and are becoming more and more self-governing each year. I have adopted the principles that actuated my predecessors in preserving good discipline in the Residence, and I feel sure that I have the sympathy and co-operation of the student body in my endeavours to apply them.

Respectfully submitted,

ROBT. R. GRAHAM.

PART III.

PROFESSOR OF ENGLISH.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit herewith my thirteenth annual report in the department of English.

My report this year is necessarily brief. It is impossible to present new material year after year in reporting merely on the teaching of a subject. Our course with the Agricultural students covers four years; and with the Normal classes in Domestic Science our course covers two years, and is identical with the First and Second years in English at the University of Toronto. Besides these two courses, we have a one year course with the Homemaker class at the Macdonald Institute.

No remarks are necessary with respect to the division of the work in English coming under the head of English Literature. While our selections vary from year to year, my experience has taught me that the present amount of work in reading authors is about right for each of the classes at the College. It is gratifying to be able to say that the students generally display marked interest and appreciation for the best English authors after one or two years of training. I wish, however, to add a few remarks respecting other branches of the work in English.

English grammar, as a separate subject, is not taught here. The omission of this subject from our course has been decided upon after some years' experience in the results of teaching it. My conclusion is that the men who come here are, for the most part, not young enough to afford the time to spend on the study of English grammar. In other words, the ultimate purpose of the course can be served more expeditiously by teaching other branches of English than English grammar. Occasionally, of course, the rules of grammar are referred to in the English classes, but only incidentally. If the student is not well acquainted with English grammar before coming here, he must continue to be ignorant of it, or must pick it up incidentally or by his own efforts.

In the matter of composition, we are trying to increase the amount of work that is done by the students, as well as to improve the manner of teaching it. There is no subject, perhaps, that is more tedious and less interesting in itself to a class of students than that of composition. At the same time, there is hardly any subject that is of more general uefulness to the student at any institution of learning. A few years ago the only composition exercises required of the students at this College were the Second Year theses, to be handed in at the end of the second year. It is obvious that such an amount of practice and a corresponding amount of instruction is altogether too little to serve the needs of our students here. We have for some years been attempting to make the work in composition effective. To this end we have tried several methods and have come to the conclusion that there is no method so effective as to assign definite subjects, to mention a definite time for the composition to be handed in, and to read carefully every composition thus handed in. Such a procedure involves an enormous amount of work on the part of the instructor, but in no other way can he so thoroughly become acquainted with the students' needs and deficiencies in this particular. We are now giving to the students of the First and Second years weekly exercises, consisting of short papers on assigned subjects. The same principle of assigning compositions and reading them carefully is applied to all classes at the institution. After they have been read, the general features of these papers are discussed with the class with a view to emphasizing the qualities of a good composition. In addition to this, two or three times during the year the students are requested to call at the room of the instructor for their papers, and each student is interviewed and his paper is discussed with him in detail. We think with these various means we are giving the students good opportunities for improvement in this direction. The chief objection to these methods, from our point of view, is that they consume a large amount of time, an amount of time in proportion to the number of students and to the amount of work done by each student.

For the past few years classes in Public Speaking, or Practical English, as they are called, have been conducted under the supervision of this department. It is a question whether such work belongs more to the instructor in English or to the instructor in elocution. Some of the students seem to want such lessons as will emphasize the elocutionary features of speaking rather than the literary. It is needless to say that, so far as the English department is concerned, the literary aspect of speaking is considered chiefly. I believe, however, that if by any means lessons on the voice, inflection, gesture, and platform etiquette, as it may be called, could be given, they would prove a benefit to our students; in fact, in the senior years the students are beginning to feel the need of just such instruction.

This year Mr. H. H. Le Drew has supplied the place of Assistant in English formerly taken by Mr. D. H. Jones. Mr. Le Drew, while at the University of Chicago last summer, took some special lessons on teaching composition, and I may say that he is doing excellent work in this direction. He has been assigning the topics for short weekly papers from the students of the first two years, and is attending to the work of reading these papers very conscientiously. Mr. Le Drew's time and attention are partly taken up by his own special subject, Economics, and in future he is likely to be more and more occupied with that subject. It will be necessary to consider, in the near future, some arrangement whereby this important work of composition with the First and Second Years may be under the care of a man who can give it undivided attention. I am thoroughly satisfied that the importance of this work will justify such provision.

The additions to the Library on behalf of the department of English have again been both liberal and judiciously selected.

Respectfully submitted,

J. B. REYNOLDS.

PART IV.

THE LECTURER IN PHYSICS.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit herewith my second report as head of the department of Physics.

INSTRUCTION.

(*a*) *Lecture Courses.*

In the first year the instruction in the department consists of courses in Arithmetic, Hydrostatics as a preparation for and followed by Soil Physics, and lastly a course in the principles of Mechanics. The work of the second year consists of Surveying, Drainage, and Farm Power by electricity, wind and water. The third year make a specialty of Meteorology, Cold Storage, and Ventilation, based upon a thorough course in Heat. In the final year, Climatology, advanced Drainage, and advanced Soil Physics are emphasized.

(*b*) *Laboratory Work.*

Laboratory practice is given all the years in the various subjects. There is one change that I would respectfully submit for your consideration, viz., that the present practical work in Soil Physics, instead of coming in the fourth year, be transferred to the second year. This work illustrates and impresses the elementary and fundamental principles that govern the securing of proper soil conditions. Under existing arrangements, men completing the diploma course and not returning for the degree have little or no practical work in this subject, though such a course would enable them to grasp more fully the importance of the physical properties of the soil such as moisture, heat, air, and sanitary conditions; and not only to grasp their importance, but to control them by adapting actual tillage operations to the producing of the desired conditions. This change would not necessitate any more time—merely a rearrangement of our present time—but it would necessitate the fitting up of a portion of the present laboratory space specially for work in Soil Physics. In the fourth year, we are unable to do any advanced work on this subject, because all the time at the disposal of the class is taken up with the elementary experiments which are necessary before problems more involved can be undertaken. Under the proposed rearrangement, the elementary work could be covered in the second year, leaving the final year free for the laboratory study of more advanced problems.

WEATHER REPORT FOR 1907.

Weather records have been kept at Guelph and other stations as in previous years. The results are given in Tables I. to IV.

Table I. Weather Report of 1907 at the O. A. C., Guelph.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Mean temperatures	19.1	18.5	29.2	38.7	48.6	61.4	66.4	68.7	62.7	42.8	33.1	25.3	42.9
Departure from normal	+.3	—.5	+2.5	—2.8	—4.9	—1.7	—1.6	+2.4	+2.9	—3.4	—.8	+.5	—.5
Lowest temperatures	—8.0	—15.0	2.0	22.0	25.0	40.0	44.0	42.0	38.0	22.0	8.0	6.0	—15.0
Highest temperature	48.0	56.0	66.0	64.0	78.5	87.0	85.0	91.5	81.5	71.0	59.0	44.5	91.5
Snowfall in inches	4.3	6.7	2.8	2.0	......	......	......	......	......	......	3.0	8.0	26.8
Rainfall in inches	.96	.22	.45	1.46	2.64	1.11	1.92	.62	2.87	3.15	4.77	2.16	23.43
*Precipitation in inches	1.39	.89	.73	1.66	2.64	1.11	1.92	.62	2.87	3 15	5.07	2.96	26.11
Departure from normal	+.01	—.67	—.63	+.09	+.33	—1.83	—1.04	—1.56	+.56	+.74	+2.92	+1.25	+.53

*Calculated by ten inches snow being equivalent to one inch of rain.

Table II. Temperatures at Outside Stations.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Maitland	12.6	6.7	2.8	37.2	47.4	63.7	64.5	64.3	61.5	43.4	34.9	22.4	38.5
Magnetawan	13.9	6.0	24.3	31.5	41.8	60.3	64.1	59.9	54.3	37.8	28.7	19.9	36.9
Marksville	13.1	9.3	25.9	30.2	42.2	60.2	64.0	59.2	63.4	40.5	32.3	21.9	38.5
Bay View, P. E. I.	14.9	11.8	21.2	34.4	43.7	53.8	60.3	60.4	55.2	43.7	36.4	28.9	38.7
St. Catharines	......	17.9	34.1	37.9	41.8	62.7	70.0	66.2	63.9	46.8	38.0	31.1	46.4
Leamington	26.1	20.9	37.5	38.6	49.0	63.3	71.4	67.7	61.7	47.2	38.5	29.9	46.2
Highest Temperatures.													
Maitland	47.0	40.0	60.0	69.0	76.0	83.0	88.0	86.0	80.0	70.0	58.0	43.0	88.0
Magnetawan	49.0	34.0	53.5	57.5	77.0	84.5	84.0	86.0	79.5	66.5	50.0	43.0	86.0
Marksville	42.0	39.0	55.0	51.0	63.0	90.0	82.0	82.0	79.0	70.0	49.0	38.0	90.0
Bay View, P. E. I.	52.5	55.0	45.0	66.0	72 0	86.0	79.0	78.0	76.0	65.0	59.0	57.0	86.0
St. Catharines	......	48.0	66.0	76.0	82.0	87.0	89 0	92.5	91.0	77.0	58.0	53.0	92.5
Leamington	53.0	42.0	70.0	74.0	75.0	87.0	87.0	87.0	84.0	74.0	53.0	49.0	87.0
Lowest Temperatures.													
Maitland	—20.0	—20.0	—4.0	16.0	26.0	43.0	48.0	44.0	46.0	21.0	10.0	—2.0	—20.0
Magnetawan	—28.5	—36.5	—18.0	4.0	6.5	33.5	34.5	35.0	28.5	12.0	5.5	—10.	—36.5
Marksville	—26.0	—30.0	—16.0	1.0	21.0	37.0	42.0	38.0	30.0	17.0	6.0	—5.00	—30.0
Bay View, P. E. I.	—12.0	—12.0	—16.2	4.0	28.0	31.8	49.3	43.0	30.0	30.0	19.0	11.0	—16.2
St. Catharines	......	—1.5	7.0	21.5	27.0	41.0	41.5	44.0	40.0	23.5	21.0	17.0	—1.5
Leamington	—.4	—.5	10.0	14.0	29.0	42.0	41.0	45.0	37.0	26.0	19.0	10.0	—.5

Table III. Precipitation at Outside Stations.

Precipitation.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct	Nov.	Dec.	Year
Maitland.													
Rain	1.81	0.	2.34	2.82	2.71	2.62	1.11	.52	3.78	2.45	3.41	2.73	26.30
Snow	5.25	6.75	0.	1.50	0.	0.	0.	0.	0.	0.	0.	11.5	25.00
Precipitation, rain	2.34	.67	2.34	2.97	2.71	2.62	1.11	.52	3.78	2.45	3.41	3.88	28.80
Magnetawan.													
Rain	1.21	0.	1.69	.84	1.42	1.99	1.65	1.74	3.36	2.83	2.01	.55	19.29
Snow	15.10	20.3	9.50	17.1	2.7	0.	0.	0.	0.	0.	16.5	21.9	103.1
Precipitation, rain	2.72	2.03	2.64	2.55	1.69	1.99	1.65	1.74	3.36	2.83	3.66	2.74	29.60
Marksville.													
Rain	.40	0.	.87	.10	2.95	3.12	3.15	4.96	4.91	2.69	1.58	1.35	26.08
Snow	26.0	13.0	14.0	.80	6.0	0.	0.	0.	0.	0.	7.0	0.	66.8
Precipitation, rain	3.00	1.30	2.27	.18	3.55	3.12	3.15	4.96	4.91	2.69	2.28	1.35	32.76
Bay View, P. E. I.													
Rain	1.02	.43	.08	.35	2.35	1.04	7.14	4.92	6.47	4.40	2.13	2.07	32.40
Snow	26.8	34.12	22.0	26.5	4.80	0.	0.	0.	0.	2.10	3.00	15.00	134.32
Precipitation, rain	3.70	3.84	2.28	3.00	2.83	1.04	7.14	4.92	6.47	4.61	2.43	3.57	45.83
St. Catharines.													
Rain	......	.28	2.73	1.33	2.92	1.75	1.97	1.53	3.35	2.61	2.70	3.11	24.28
Snow	......	12.5	3.00	0.	1.5	0.	0.	0.	0.	0.	0.	15.55	32.55
Precipitation, rain	......	1.53	3.03	1.33	3.07	1.75	1.97	1.53	3.35	2.61	2.70	4.66	27.53
Leamington.													
Rain	3.99	.74	2.34	1.97	2.27	4.77	2.46	1.17	4.86	2.57	2.47	2.47	37.08
Snow	14.0	7.0	0.	.25	.5	0.	0.	0.	0.	0.	0.	0.0	21.75
Precipitation, rain	5.39	1.44	2.34	1.99	2.32	4.77	2.46	1.17	4.86	2.57	2.47	2.47	39.25

Table IV. Length of Season at Various Stations.

Station.	Last killing frost in Spring.		First killing frost in Autumn.		No. of days between. 1907	Average length of season free from killing frost.
	Date.	Deg.	Date.	Deg.		
Guelph	May 20th	....	Oct. 20th	....	153	*145 (20)
Maitland	May 11th	26.0	Oct. 9th	28.0	151	150 (2)
Magnetawan	May 30th	27.0	Sept. 26th	28.5	119	112 (2)
Marksville	May 30th	30.0	Sept. 26th	30.0	119	122 (2)
Bay View, P. E. I.	May 12th	28.0	Sept. 29th	30.0	140	....
St. Catharines	May 12th	27.0	Oct. 21st	25.0	162	....
Leamington	May 21st	29.0	Oct. 21st	26.0	153	....

* Numbers in brackets denote number of years from which averages is taken.

DAMAGE BY LIGHTNING IN 1907.

Reports of damage by lightning have been collected this year as previously. The results are given in Tables V. to VIII.

Table V. Buildings Struck in 1907.

How reported.	Barns.				Houses.				Others.			
	Burned.	Damaged.	Totals.	Loss.	Burned.	Damaged.	Totals.	Loss.	Burned.	Damaged.	Totals.	Loss.
Personally	22	9	31	53,548	1	6	7	1,257	2	1	3	35,885
Newspapers	22	8	30	*51,763	4	8	12	*2,012	2	8	10	**
Totals	44	17	61	105,311	5	14	19	3,269	4	9	13	35,885

*Loss at same rate as on those personally reported.

**One of the losses personally reported being a large packing house valued at $30,250 and the remainder being all small buildings, the loss on the latter could not be taken as proportional.

Total estimated loss on barns, houses and other buildings, $144,465.

Table VI. Animals Struck.

Animals.	In field.	By fence.	Under tree.	In shelter of steel roller.	In or near building.	Location not reported.	Totals 1907.	Totals 1901-1907.
Cattle	6	1	12	....	1	9	29	222
Sheep	....	1	5	....	....	....	6	137
Horses	1	....	4	....	3	2	10	71
Pigs	....	....	....	8	....	1	9	21

Table VII. Summary of Trees Struck from 1901-1907.

Year.	Elm.	Pine.	Oak.	Maple.	Apple.	Basswood.	Poplar.	Ash.	Willow.	Cedar.	Hemlock.	Balsam.	Spruce.	Chestnut.	Hickory.	Birch.	Beech.	Butternut.	Fir.	Walnut.	Pear.	Thorn.	Total.
1901	7	8	1	2	..	5	..	..	..	..	2	..	..	1	..	..	..	..	..	..	..	..	26
1902	6	1	5	4	..	2	1	2	1	..	..	1	..	..	1	..	1	..	..	..	..	..	25
1903	5	3	1	..	1	..	1	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	13
1904	6	4	1	..	2	..	2	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	17
1905	4	1	1	1	..	..	..	..	..	3	..	..	1	..	..	..	..	..	1	..	..	..	13
1906	7	5	6	3	5	..	2	..	3	1	2	2	2	1	..	2	..	..	..	1	1	..	43
1907	5	3	..	..	..	..	1	1	..	..	..	1	1	..	1	..	..	..	..	..	..	1	14
Totals	40	25	15	10	8	7	6	5	5	4	4	4	4	2	2	2	1	1	1	1	1	1	151

Table VIII. Other Information Regarding Barns.

Barns personally reported 31.

Windmill.	
Mill on or near	8
No mill	21
Not specified	2

Location.	
On hill	6
On knoll	6
On plain	13
In valley	2

Distance from railway.	
¼ mile	5
½ "	2
1 "	4
2 miles	4
3 "	2
4 "	4
5 "	2
6 "	2
7 "	2
8 "	1
Not specified	

The number of buildings reported is not quite so large as last year, though second largest since 1901, when records were begun.

Of the buildings personally reported, all but one were not protected by lightning-rods. One is doubtful, our correspondent living some distance from the scene and the owner not having yet answered our enquiries.

We sometimes hear it claimed that windmills are dangerous, sometimes that they are a protection. From reports we cannot conclude either way, for taking the country over, many more buildings are without mills than with them; likewise most of the barns struck have none.

The same reasoning applies to location. No site seems to be immune from stroke.

We have heard it claimed that buildings near railways were more liable to stroke. The reports would seem to lend some strength to this claim, but no settled conclusion can be drawn.

DRAINAGE SURVEYING.

Believing as we did, and still do, that the drainage surveying being done by the department of Physics is the most important work before it today except instruction to students, an active campaign was planned at the beginning of the year. During the winter months a series of articles on farm drainage operations were written for the *Farmers' Advocate* in the hope of creating a wider interest in underdrainage and a better undrstanding of its importance. Close upon this followed the announcement in the leading dailies of the Province and in some two hundred and twenty-five weeklies that the department was prepared to give practical demonstration of methods of surveying land for drainage purposes, laying out the drains and determining the grades, and size of tile—the same announcement that had been made for two years past. The response was much more general than in previous years, the applications for assistance coming in very rapidly. There were besides so many enquiries as to methods of operation in drainage work that the correspondence became very heavy, to relieve which a small pamphlet on "Farm Drainage Operations" was issued. Some conception of the growing interest in the subject may be gained when we state that the whole issue of 1,000 copies has been distributed and that almost entirely in response to direct applications for it. Believing that the information contained in it may be of some interest, it is given farther on in this report.

Altogether we received 126 applications for instruction in drainage work, a few of which have come in since the season closed. Of these 70 were attended to, of which 34 were done by Mr. Thom, 11 by Mr. Wolverton, and 25 by myself. Several affected more than one person, so that, all told, we aided in laying out drains on 107 farms. In all 102 days' work were necessary, or nearly one day per farm; and besides this time actually spent surveying, there was the time spent in travelling and in making out in rough the plans for the various drains. One draftsman was busy all summer making finished copies of these plans, which were supplied to the respective owners. Realizing early in the season that Mr. Thom and I would be unable to reach all our applicants, representation was made to you and you were generous enough to provide us with an extra man for one month, in the person of Mr. H. A. Wolverton, who rendered good and satisfactory service. Still there were some 56 applications that we were unable to attend to. The applicants were written to and asked if they wished their names placed on next year's lists. Some twenty-four have signified their desire to have us visit them next spring.

The educational side of this work needs special mention. We make it a point to instruct every man in the methods used, so that in future problems he will be able to run his own drains and also work out the grades and determine the size of tiles. Each man who is thus possessed of the power to solve a drainage problem becomes an example to his neighbors, who learn from him the methods he uses. The aggregate value of one hundred centres of drainage instruction can scarcely be over-estimated. There are hundreds of thousands of acres now practically valueless which will be reclaimed and become the best land in the country, as a result of this instruction in drainage. Hence, as I said in the beginning, I look upon this drainage work as the most important before the department, except that of actual instruction of the students at the College. For these reasons I would commend to your consideration the suggestion that the staff of the department be increased by one permanent man as demonstrator, whose first duty shall be the demonstration to the farmers of the Province of the operations of drainage surveying. This work would continue through eight months of the year from April to November inclusive; during the remaining four his time to be devoted to investigation work, and assistance in the general work of the department.

The pamphlet previously referred to, with some slight additions, follows.

FARM DRAINAGE OPERATIONS.

(Issued by the Department of Physics, Ontario Agricultural College, Guelph.

About two years ago, at the suggestion of Professor Reynolds, the Minister of Agriculture authorized the department of Physics at the College to send out representatives among the farmers to give advice on drainage to those requesting it. The response to this offer of assistance has been very gratifying indeed. During the autumn of 1905, and the whole season of 1906 many farms were visited and surveyed, completely or in part, and the owners furnished with maps showing them the elevations of the different parts of their farms, the slope of the land, the proper outlets, and the best plan for draining the various slopes. This spring has witnessed a vast extension of the work. With all this information at hand, however, they have still to construct their drains. We have found various methods in use. Some have been digging by the water test—the grade was right when the water would run—but this meant a wet ditch bottom, and very mussy, disagreeable work. Sometimes the work had to be stopped for want of water. Others had been digging by the carpenter's level laid upon a board in the ditch, the bubble being displaced the same amount each half board-length the grade was uniform, still others by the triangle or T square and plumb-

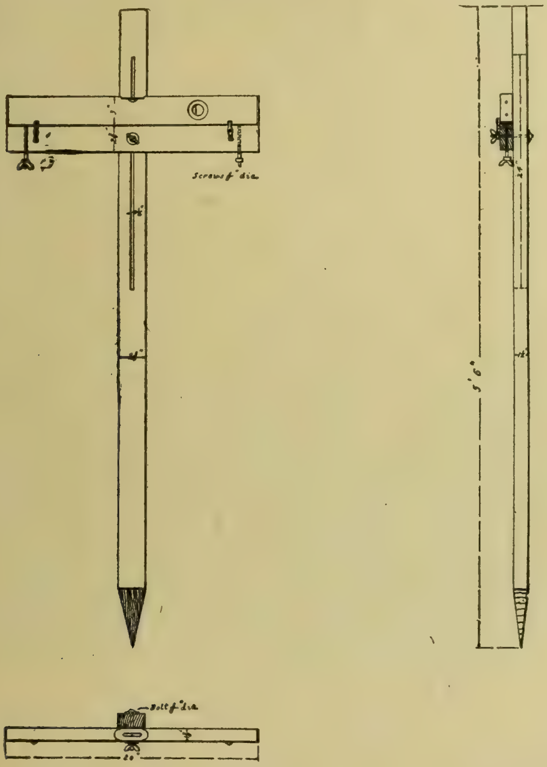


Fig. 1.

A Home-Made Drainage Level.

bob. But sometimes they "lost fall" and ran their ditch to the surface too soon. Not knowing the total fall from the upper end to the outlet, the grade was not properly chosen.

Nearly every one for whom we do surveying wishes to know our methods of construction. It is the purpose of this pamphlet to give these methods.

We begin by finding the fall over the drain. The first requisite is a level adapted to finding the difference in elevation between two points. Figure I represents a home-made drainage level. It consists of:

(1) An upright piece of wood 5.5 feet high, 3 inches wide, and 1.5 inches thick, and sharpened at the bottom, and with a slot 2.5 feet long, beginning within six inches of the top.

(2) A cross-piece bolted to the upright by a bolt through the slot; washers at head and nut. The cross-piece may be rotated about its centre.

(3) A long carpenter's level with *straight* top sitting on the cross-piece, held loosely in position by two buttons.

(4) Two wood screws with thumb-head, passing through the cross-piece and touching the bottom of the level.

When the instrument is to be used, the upright is sunk *firmly* into the ground as nearly perpendicular as possible. The level is levelled roughly by tilting the cross-piece, and then the thumb-screws are used for more accurate adjustment, either end of the level may be raised a little, as needed, by the screws at the end. The photograph shows the level in use. It requires two men to operate it, A to sight, B to carry the measuring pole or staff and note the fall or rise from one place to another.

Determining the Fall over the Ditch.

DETERMINING THE FALL OVER THE DITCH.

When the location of the ditch has been decided on, it should be staked out with three or four stakes six or eight feet high, to plow by when digging is begun. They will be removed when the first furrow is plowed. Then the length of the drain should be determined. If a 66-foot tape is used in measuring, a short stake, say three feet long, should be set up every 66 feet along the ditch, but these should be set *three or four feet to one side of the ditch*, so that they will not be disturbed by the plow—they will be needed later. If a 100-foot tape is used, these stakes would be placed 100 feet apart. We use a 100-foot tape. For convenience the stakes may be numbered 0, 100, 200, 300, etc.; stake 0 being at the outlet, stake 100 being 100 feet from the outlet, stake 200 being 200 feet from the outlet, etc. Measurements and digging are usually begun at the outlet.

When the drain is staked we are ready to determine the fall. The level is set up *about half way between stake 0 and stake 100* and levelled, the cross-piece being in line with the stakes. B stands the staff at stake 0 and places his pencil across it (as shown in photograph), and A sights over the level directing B to raise or lower the pencil until it is in line with the level. B notes the height of the pencil on the staff, say 4 feet 10 inches, for illustration, and then moves the staff to the next stake, number 100, *the level remaining in the same position.* A now sights forward to the staff and B places the pencil the proper height, as before, say 4 feet 1 inch.

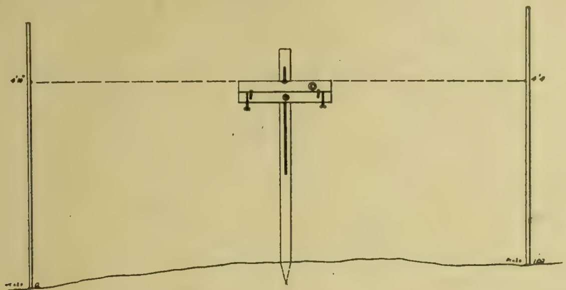


Fig. 2.

It is easily seen from figure 2 that the difference of nine inches between the two readings, 4 feet 10 inches and 4 feet 1 inch, is the rise from stake 0 to stake 100. The level may now be moved about halfway between stake 100 and stake 200, *the staff remaining at stake 100,* and the fall from 100 to 200 determined as in the first section. This is continued the full length of the drain.

Observe again that if the fall or rise between two points is to be found the level is set up *about half way between them* and readings taken *back* to one and *forward* to the other, *the level remaining stationary throughout.* The readings are recorded in a note-book suitable for the purpose, and the fall or rise between any two succeeding stations is found by simply *subtracting the back sight of one station from the foresight of the next* or vice versa. Don't bother with the height of the level, it is unnecessary and confusing. The heading of each page tells which drain the notes on that page refer to. The following is suggested as a suitable form for the notes.

NOTES ON LATERAL NO. 1.

Stake.	Back sight.		Fore sight.		Fall.		Rise.		Elevation.	
	Feet.	Inches.	Feet.	Inches.	Feet.	Inches.	Feet.	Inches.	Feet.	Inches.
0	4	10	....		....		....		10	0
100	5	2	4	1	....		0	9	10	9
200	5	3	3	11	....		1	3	12	0
300	5	0	3	9	....		1	6	13	6
400	4	6	4	0	....		1	0	14	6
500	4	7	4	3	....		0	3	14	9
600	4	5	4	5	....		0	2	14	11
700	4	7	4	8	0	3	....		14	8
800	....		5	3	0	8	....		14	0

Note that in six out of the eight hundred feet sections there were rises, in the other two there were falls. The six rises total 4 feet 11 inches, and the two falls total 11 inches, hence on the whole there was a rise from stake 0 to stake 800 of 4 feet 11 inches minus 11 inches, equalling 4 feet.

The last column, "elevation," needs a word of explanation. In comparing the altitude of different towns, for instance, we use the sea-level as a datum plane, i.e., a level of comparison. Toronto Bay is 250 feet, the Agricultural College at Guelph 1,150 feet above the sea, from which we learn that the College is 900 feet above the bay. In surveying a ditch we cannot use the sea as a datum, for we do not know how much stake 0 is above the sea, hence we must choose an arbitrary datum. In the example given we have chosen it ten feet below the ground surface at stake 0. Then the elevation of stake 0 above this chosen datum plane is 10 feet. Since there is a rise of 9 inches to stake 100 its elevation would be 10 feet 9 inches, and so on with all the other stakes. To find the fall from any one stake to any other, we have only to subtract the elevation as given in the last column. For instance the rise from stake 0 to stake 800 is 14 feet minus 10 feet, equalling 4 feet, the same as we obtained by subtracting the total falls from the total rises. This last column, while not absolutely essential, is the most convenient method of comparing any one station with any other. If starting our survey at the source instead of at the outlet we would choose for the elevation of the starting point some height greater than the total fall to the outlet.

DETERMINING THE GRADE OF THE DITCH.

We find that with the majority of farmers the chief difficulty is the determination of the grades at which they should dig their ditches, hence we give here a method by which they can work this out in advance of their digging and thus know that they are not going to "run out too soon" nor "run too deep." It will possibly take a little study to follow it through, but anyone of average intelligence can do so, and after this is once done he can apply the method.

The different steps may be given as follows:

(1) Procure a piece of co-ordinate or cross-section paper, i.e., paper ruled in large squares one inch to the side and these again into small squares one-tenth or one-twelfth of an inch to the side. This can be procured from any bookseller at five to ten cents a sheet 15 x 20 inches in size. If co-ordinate paper is not to hand a large sheet of foolscap may be ruled with light upright lines and made to answer well. For clearness of reproduction some of these lines have been omitted. (See Fig. 3.)

(2) Let elevations be measured *up and down* on the paper and distances between stakes be measured *right and left*. The datum plane or level of comparison will then be at the bottom of the paper and stake 0 at the left hand side.

(3) Let one large square up and down equal two feet of elevation.

(4) Let one large square right and left equal 100 feet from stake to stake.

(5) Number the stakes along the datum plane as shewn in figure.

(6) At each stake make a dot the proper distance above the datum plane, shewing the elevation of that stake, e.g., at stake 0 in the figure a dot is made 10 feet, i.e., 5 squares, above the datum; at stake 100 a dot is made 10 feet 9 inches, i.e., 5¾ squares above the datum; at stake 200 a dot is made 12 feet above the datum; and so on, the proper elevation of each stake being marked.

(7) Join all these dots by a line. This line gives the shape of the ground surface from stake 0 to stake 800, showing at a glance just where the fall is slow or rapid.

(8) At stakes 0 and 800 make dots 3 feet below the surface, indicating a trial depth for the ditch at those points. Then lay a ruler on the paper and draw a line connecting these two dots—see dotted line in figure. This

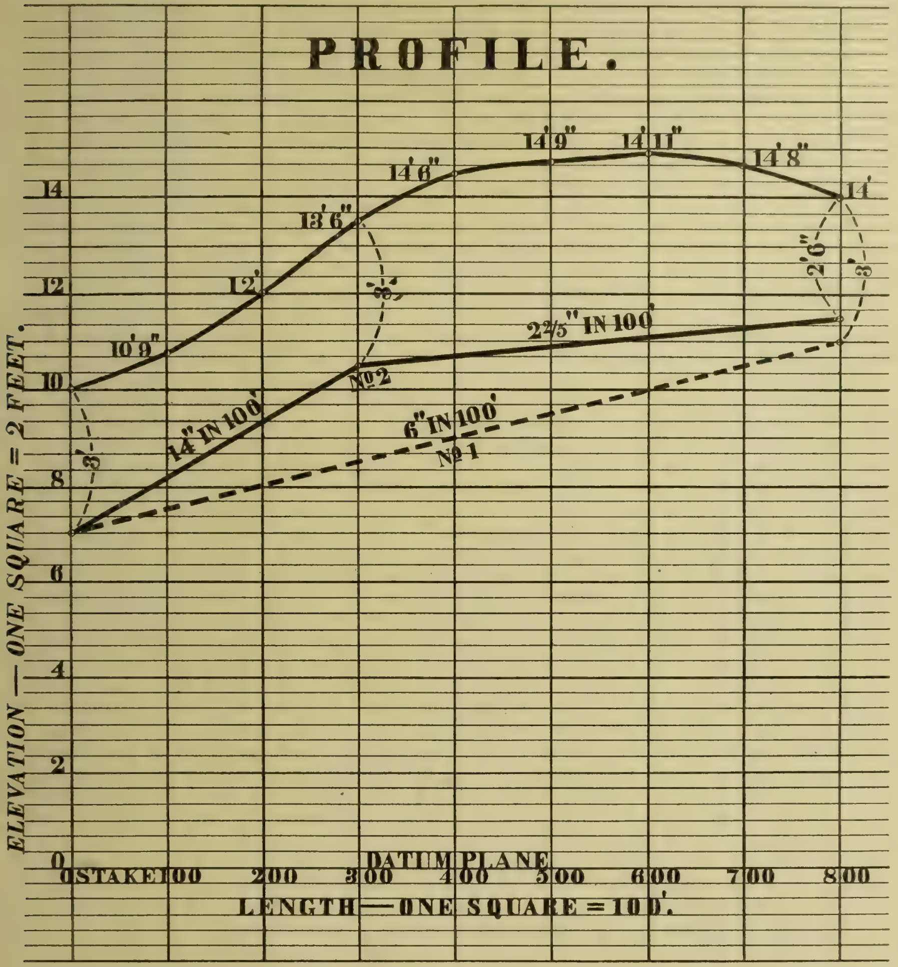


Figure 3. Illustrating method of determining the grade or grades for ditch bottom.

line will show where the ditch bottom would run if the ditch were dug at uniform grade and made 3 feet deep at both ends. By counting the number of spaces between this dotted line and the ground surface at any point, the depth of the ditch at that point can be learned. Applying this test we see that the ditch shown in the figure would be four feet deep or more throughout most of its length, and that it would be five feet or more for over half its length, in some places being 5½ feet. Hence we conclude that it is not advisable to dig this ditch three feet deep at both ends and of uniform grade, if it can be avoided—there is too much digging.

Whether it can be avoided or not depends upon the amount of fall from stake 800 to stake 0. The fall is 4 feet, which is equilavent to a grade of 6 inches in 100 feet. Now this is much steeper than is absolutely essential for effective drainage. The minimum grade for safety is about 2 inches in 100 feet. A drain to be *safe* must have grade enough to give the water a *velocity sufficient to move any sand* that may enter at the joints of the tile. 2 inches in 100 feet will give that velocity and a little to spare. Many tile drains laid on slower grades than this have done and are doing good service, but where there is any possibility of coarse sand entering the tile, they are within the danger zone.

Then, coming back to our problem, we see that we have plenty of fall, hence we can dig the upper section of the drain to a slow grade, and the lower section to a steep grade. Choosing depths of 2 feet 6 inches at stake 800, 3 feet at stake 300 and 3 feet at stake 0 and joining the dots made at these depths, we obtain a new ditch bottom with a change of grade at stake 300, the grade of the upper section being 2 two-fifths inches in 100 feet and of the lower section 14 inches in 100 feet. This is a much more desirable bottom than that shown by the dotted line, the deepest digging being a shade less than four feet, and the shallowest 2 feet 6 inches. The average saving in digging by using bottom No. II rather than No. I, would be almost one foot throughout the entire length of the drain. A similar profile may be made for any drain, once the elevations at the different stakes are known. There is one critical point in each drain, viz., the outlet; knolls and basins where they occur are also critical points—we must take care to choose grades that will not require us to go too deep in the knolls not too shallow in the basins. When striking the grades we consider first the critical points—the others will look after themselves.

(9) To determine the grade on a section of drain when the depth is different at the two ends of the section, we proceed as follows: Subtract the elevation of the ground surface at the two ends (this gives the fall on the surface), and then add or subtract the difference in depth, according to which end is the deeper. For example, the upper section of the drain in figure 3: 14 minus 13 feet 6 inches equals 6 inches, hence in the ground surface there is a fall of 6 inches; but the drain is six inches deeper at stake 300 than at the upper end, hence the fall in the ditch bottom is 6 plus 6, which equals 12 inches in 500 feet; hence the fall per 100 feet equals 12 inches divided by 5, which equals 2 and two-fifths inches.

Use of Plow in Digging Drain.

When the drain has been staked out and the grade determined, one is ready to begin digging. Experience has shown that in the earlier stages the plow can be used to great advantage. Perhaps the most effective method is somewhat as follows:

(1) Using an ordinary plow, open up the drain as wide as possible, throwing one furrow each way. In stubble, fallow or plowed ground these furrows will not need shovelling, as they will be thrown well out; in sod they may need rolling farther back.

(2) Using an ordinary plow, again plow two furrows, one each way, in the bottom of the ditch already formed, throwing each furrow toward the centre of the ditch. The second one will turn the first back partly, but this serves only to loosen the soil more thoroughly. The sides of the ditch, which were very sloping after the first plowing, have been trimmed off perpendicular and straight by the land-side in the second plowing, which is now ready to shovel out; and it will be found in prime condition.

The ditch at the present stage should be about 18 inches wide. It may be objected that this causes needless shovelling, to which I answer that the plow is to be used till the ditch is 2½ feet deep, and it is necessary to have the top wide enough to accommodate the handles. The bottom will not be any wider than necessary.

This operation should be repeated till the ditch is about 15 or 18 inches deep. In order that the horses may walk comfortably, one on each side of the ditch, the lines are opened up as wide as possible and a long doubletree used. To permit the plow to go deep enough in the ground, a chain about six or eight feet long is put in between the beam and the doubletree. This plow will not be found satisfactory after a depth of 15 or 18 inches is reached, as the drain gradually becomes narrower.

(3) Now using a drainage plow of some sort, plow right down the centre of the drain, and come back in the same furrow. This forms a narrow ditch in the bottom, both sides of which are trimmed straight and perpendicular. With a narrow shovel this furrow may now be removed. This operation is repeated again and again until the drain is almost as deep as required.

For this third operation a plow must be fitted up specially—we want something to dig a narrower trench than heretofore. Take an ordinary narrow plow and remove the mould-board. This of course removes the attachment for the lower end of the right handle, but bolt a narrow block between the handles and run a brace from it to the back bolt in the beam, and the handle is as steady and as firm as ever. Put on a new narrow point. If one has much draining to do, it is advised to make further and permanent alterations in the plow used for this third operation. The rod between the handles should be taken out, shortened, and replaced, thus bringing the handles closer together. The top section of the ditch need not then be so wide as before. It is also wise to shorten somewhat the braces that run from the bead to the handles, thus raising the latter; the wide section of the ditch need not be so deep as before.

An ordinary subsoil plow serves very nicely, too, for this third operation, but the best thing I have seen for it is the "pick or pavement plow" manufactured by the Verity Plow Co., of Brantford. In hard ground the home-made drainage plow is very hard to control when the ditch becomes deep—sometimes it goes too deep, at other times, because of its lightness, it skims along the surface, doing no good. The subsoil plow, too, has these defects, and besides it is not strong enough in very heavy soil. I have seen a subsoil plow twisted so out of shape as to be useless for any purpose, and that simply because of the stiffness of the soil and uncontrollability of the plow. The pick plow has none of these defects—it is heavy, and therefore strong enough for all purposes, rides steadily at a uniform depth, and is easily held. Because of its weight it is somewhat cumbersome in turning at the end, but it performs its work so effectively that this slight drawback may be overlooked. This plow is not made primarily for drainage work, but for tearing up pavement, old roads, etc., hence the handles as in an ordinary plow are too low and too wide. But they can be raised and narrowed as described above—which was actually done on the particular pick plow which I saw used for drainage purposes.

This method of digging a ditch is not given as original, but as one that has been tried and has been proven eminently satisfactory. Men of wide experience, who have used various methods, and who have discarded others in favor of this one, assure me that this is the most economical they have tried.

Grading the Ditch.

Having determined the grade and dug the ditch within a few inches of its final depth, the next operation is to remove the remaining earth, leaving the ditch bottom with an even fall throughout. The accompanying drawing will aid in understanding the method to be described:

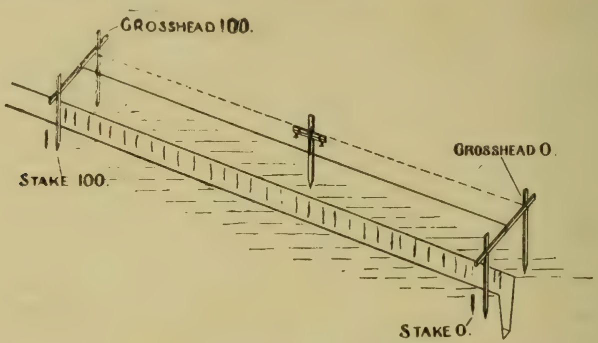


Fig. 4.

Two cross-heads are set up 100 feet apart, one at stake 0 and the other at stake 100, as shown in figure 3. Both are put 7 feet above the ditch bottom, the latter thus being higher than the former by the amount of fall in 100 feet, *e.g.*, if the fall is 14 inches in 100 feet, then cross-head 100 is set just 14 inches higher than cross-head 0. The stakes must be stout and driven firm in the ground. A light cord—binder twine does very well—is then stretched *tight* and tied over the cross-pieces, so that the sag is negligible. Since one end is 14 inches higher than the other, this cord has the same fall as the ditch bottom is to have, and hence if the latter is made parallel to the cord it will have the required fall. It is necessary to provide a light testing stick 7 feet long, since the cord is 7 feet above the ditch bottom. With a narrow shovel the earth is gradually removed until the stick standing on the bottom just passes under the line. When such is the case the ditch is deep enough at that point. When every point between stakes 0 and 100 just tests 7 feet from the overhead line, the grade of this section is uniformly 14 inches in 100 feet. Any other grade is arrived at in a similar way.

But how shall we place the cross-heads 7 feet above the ditch bottom?

First. We must determine the depth of the ditch at the outlet. A drain usually empties into another tile drain or into an open ditch, the depth of either of which may be determined by using the drainage level and the measuring staff as follows: Set up the level as previously directed and sight over it at the staff, which is placed first on the surface of the ground, and second on the bottom of the main drain or of the open drain. Subtracting the readings, we have the depth of the ditch at the outlet. Suppose for illustration that it is 3 feet 5 inches.

Second. We must determine the height the cross-piece is to be placed above the ground. This is done by subtracting the depth of the ditch from the length of the testing stick, *i.e.*, if the ditch is 3 feet 5 inches deep, as supposed above, then cross-head 0 would be 7 feet minus 3 feet 5 inches = 3 feet 7 inches above ground. One end of the cross-piece is clamped to one of the stout stakes at this height (3 feet 7 inches), the cross-piece is then levelled by means of the carpenter's level, and the other end clamped to the other stake.

Third. We must find a point on stake 100 just the same height as the top of cross-head 0. To do this the drainage level is set up about half way between stakes 0 and 100. The level is moved up or down on the standard until when adjusted it is found by sighting (see dotted line) to be just on a level with the top of cross-head 0. Then by sighting toward stake 100, as shown by dotted line, a point is found which is also on same level as the top of cross-head 0. This end of cross-head 100 is clamped just *14 inches higher* than the point shown by dotted line, the cross-head levelled, and the other end clamped. Cross-head 100 is thus exactly 14 inches higher than cross-head 0.

Why have the over-head line *seven* feet above? Six feet is not enough to clear the man and his shovel. Eight feet would be more than is necessary. For any other grade than 14 inches in 100 feet cross-head 100 is clamped the corresponding amount higher than the dotted line. When the first section has been graded, and while the line is still strung, it is wise to lay the tile so that they may be tested to grade by the same line, a notch being cut in the testing stick at a distance from the end equal to the outside diameter of the tile. When the line just meets this notch the tile is in proper grade. After the laying has been finished cross-head 0 is moved to stake 200 and set the required amount higher than cross-head 100 and this section of the drain graded as was the first section.

In practice it is found convenient not to tie the line to the cross-pieces, but to simply pass it over them and tie a stone to it. This keeps the line always at the same tension and takes up any stretch that may occur. As the line sags some on a 100 feet section, it is usually found best to interpose one or two light cross-heads between the end ones. They can be sighted in position by those at the end.

There are numerous devices for aiding in digging a ditch to the required grade, but the overhead line here described is the best I have seen. I know quite a number of practical ditchers who have abandoned others in its favor, but none who have abandoned it for others.

It is not wise to allow the digging to get too far ahead of the laying, as rain is liable to occur at any time, causing the sides to cave in in spots and in other ways interfering with the finished bottom. The joints of large tile should be protected to prevent sediment entering the tile while the earth is becoming set. Sods placed with the grass next the tile are excellent for this purpose. Tar paper also is good. When the drain has been filled a ridge should be plowed over it in a well-rounded crown from eight to twelve inches higher than the land on either side and to a width of eight or ten feet, otherwise large quantities of water are likely to collect over the drain and soak down through the loose soil, sometimes choking the tile with sediment, at other times gradually forming a channel beside the tile, washing the soil away and allowing one or two lengths to roll out of line and thus partially or wholly block the drain.

WHAT SIZE OF TILE TO USE.

In every drainage problem we are confronted with the question. "What size of tile shall we use?" a question that cannot be answered off-hand. The amount of water that will flow through a pipe depends upon three factors, the size, the roughness and the slope; so when we are asked what size of tile to use in a given case we must determine first the area to be drained, and secondly the slope—the roughness is a constant factor and already known.

The acreage that various sizes of tile are capable of draining on various slopes has been carefully worked out by McConnel, and his table is subjoined.

Table of Size of Tile Pipe of Main Drain (McConnell).

Fall.	Acres Drained.					
	3-inch tile.	4-inch tile.	6-inch tile.	8-inch tile.	10-inch tile.	12-inch tile.
1 foot in 20	18.6	26.8	74.4	150.0	270.0	426.0
1 " 30	15.1	21.8	60.4	128.0	220.8	346.0
1 " 40	12.9	18.6	51.6	108.8	189.6	298.4
1 " 50	11.9	17.0	47.7	98.0	170.4	269.0
1 " 60	10.9	15.6	43.4	90.0	156.0	246.0
1 " 70	10.0	14.5	39.9	83.0	144.4	228.1
1 " 80	9.3	13.4	37.2	77.0	135.0	213.0
1 " 90	8.1	12.6	35.0	72.5	127.0	200.5
1 " 100	7.3	11.9	33.1	69.2	120.6	190.5
1 " 150	6.7	9.5	26.6	56.0	97.3	154.4
1 " 200	5.7	8.2	22.8	48.0	83.9	132.5
1 " 250	8.1	7.5	20.4	42.4	74.4	117.0
1 " 300	4.6	6.9	18.4	38.2	65.5	107.0
1 " 400	4.1	5.9	16.5	32.6	60.3	90.7
1 " 500	3.7	5.2	14.8	30.1	54.0	81.6
1 " 600	3.3	4.7	13.3	28.0	48.6	74.0
1 " 800	2.9	4.1	11.4	24.0	41.9	65.0
1 " 1000	2.6	3.7	10.2	21.2	37.2	56.0
1 " 1500	2.1	3.0	8.5	16.8	30.8	47.0
1 " 2000	1.9	2.8	7.4	15.0	25.0	40.8

Suppose a man has 12 acres to drain and the slope of his main is 1 foot in 600, then we look down the list of falls till we find 1 foot in 600 and follow this line to the right. A 3-inch tile would not do; it drains only 3.3 acres. A 4-inch tile drains only 4.7 acres. A 5-inch tile, not given, but probably drains about 7 to 9 acres. A 6-inch tile fills the bill, as it is capable of draining 13.3 acres. The size to use for any other slope is determined in the same way. This rule applies to the submains and laterals as well as to mains. Owing to the great amount of friction in small tile compared with the volume of water they can carry, they are much more likely to clog with sediment than are the larger ones, so much so indeed that a 2-inch tile should never be used except on a steep grade. They are almost sure to clog in time on a slow grade.

Depth and Distances Apart.

A mistake that beginners often make is that of putting their drains too shallow. This arises from not understanding fully the action and function of the drain. To begin with, why is it necessary to drain? Because the roots of plants cannot live and thrive in soil containing excessive water. This being so, we must next ask how deep do the roots naturally go in the soil where the conditions as to drainage are perfect? If they go six inches only, then it is sufficient to drain our soil on the surface alone. If they go three feet deep, then for best results we must drain three feet deep. But, again, how deep *do* they go? This varies somewhat with the crop, but the roots of corn, winter wheat, oats, barley and clover, some of our staple crops, penetrate *at least* from three to four feet in average field conditions. Then how deep should we drain? From three to four feet in order that the roots of these crops may have full opportunity to penetrate the soil. It may be suggested that two feet would be sufficient for the early needs of the crop, and that as the season advanced the water would naturally recede farther below, thus giving the roots plenty of space. This argument would have some weight but for one fact: the "water-table" in drained land is not level, but curved. If, in a field that is underdrained, one were to dig a series of holes four feet deep every ten feet between two drains, and if after a heavy rain he were to observe the water in the holes for a day or two, he would find that in a very short time no water remained in the hole at either drain, but the one situated midway between the drains would stand full for a long time, and the others would have less and less in them as he approached the drains, thus showing that the water-table is a curved surface, beginning at either drain and rising between. How fast does it rise? That varies with the soil and with the time since rain. In a clay in fairly good condition, when flow in drains begins to lessen, it will be found that the water rises 1 foot in about 25; in loam, 1 foot in 33; in lighter soils the rise will be slower still. The closer the drains are together the less the height of the crest of the water-table above the drains; the farther apart, the higher the crest; hence the closer the drains are together the shallower they may be; the farther they are apart, the deeper they must be. The depth and distance apart must be so chosen that midway between the drains the soil will be drained a foot and a half or two feet within forty-eight hours after rain, for if the roots are submerged longer than this, they begin to suffer. Applying the gradients of 1 foot in 25 for clay and 1 foot in 33 for loam, we arrive at the general conclusion that if drains are from 3 to 3½ feet deep, they should be placed from 50 to 66 feet apart in clay or clay loam, and from 75 to 100 feet apart in lighter soils. But this is only a general conclusion, and judgment must be used in each individual case.

WHAT TO DO WHEN AN OWNER REFUSES OUTLET FOR DRAINAGE WATER.

In our experience of the past two years, we have found another phase of the subject equally interesting. Most men for whom we have done work have asked at some stage, "What is to be done if one man refuses an outlet for the drainage water from his neighbor's farm? Can he prevent his neighbor from constructing such an outlet? If not, must he bear any portion of the expense, or must the neighbor bear it all?" The following is an outline of what should be done in such cases:

COURSE OF PROCEDURE UNDER THE DITCHES AND WATERCOURSES ACT.

Before any recourse is had to legal procedure, the parties concerned in a drain affecting two or more owners should get together informally and endeavor to agree on some apportionment of the labor and expense of construction and maintenance. When such meeting and agreement are not possible, then legal proceedings become necessary. The first legal step in the adjustment of a dispute about drainage matters is the formal calling of a meeting of all parties interested. This meeting is to be called by him who requires the construction of the drain. He must serve notices in writing upon all concerned, appointing a day, hour and place convenient to the site of the ditch, at which all the owners are to meet and estimate the cost of the ditch, and agree if possible upon the apportionment of the work, and supply of material for construction among the several owners *according to their respective interests therein*, and settle the proportions in which the ditch shall be maintained; the notices shall be served not less than *twelve clear days* before the time named therein for meeting. (R.S.O. 1897, c. 285, s. 8.)

Blank forms for the notices are given in the Act, a copy of which may be had from the clerk of the municipality. Notices may be served personally or by leaving them at the place of the owner or occupant, with a grown-up person residing thereat, and in case of non-residents then upon the agent of the owner, or by registered letter to the owner at the post office nearest to his last known place of residence. (R.S.O. 1897, c. 285, s. 15.)

In case an agreement is arrived at, it shall be reduced to writing, signed by all the owners, and within six days be filed with the clerk of the municipality, when it becomes as binding as the award of an engineer, and may be enforced in like manner (R.S.O., c. 285, s. 13 (1)). But such amicable agreement at this stage will seldom need enforcement, as the parties thereto will, of their own accord, fulfil their parts, and no further proceedings will be necessary.

In case an agreement is not arrived at, either at the meeting or *within five days thereafter*, then the owner requiring the ditch may file with the clerk of the municipality a declaration of ownership of his land and also a requisition naming all the parcels of land to be affected by the ditch and the respective owners thereof, and requesting that the engineer appointed by the municipality be asked to appoint a time and place in the locality of the proposed ditch at which he will attend (R.S.O. 1897, c. 285, s. 14), and examine the locality; and if he deems it proper, or if requested by any of the owners, he may examine the owners and their witnesses present, and may administer an oath or affirmation to any witness examined by him (R.S.O. 1897, c. 285, s. 16 (1)). Within thirty days after his attendance the engineer will make his award in writing, apportioning the work and the furnishing of the material among the lands affected and the owners thereof, *according to his estimate of their respective interests in the ditch,* fixing the time for the performance by the respective owners, and apportioning the maintaining of the ditch, so that as far as practicable each owner shall maintain the portion on his own land. (R.S.O. 1897, c. 285, s. 16 (1)). In case the work apportioned to any owner is not completed in the allotted time, the engineer may let the contract for its performance to the lowest bidder, the expense chargeable to the land of the defaulting owner. (R.S.O. 1897, c. 285, s. 28.)

Thus we see that a man is bound to give outlet for the natural drainage water from his neighbor's farm, and, not only so, he is liable for cost of construction and maintenance in proportion to the benefit he may be adjudged by the engineer to derive from the drain. The man who requires the outlet must not forget, however, that he, too, is liable for outlet expense in proportion to his interest in said outlet.

INVESTIGATIONS.

In previous years much time has been given to investigation in soils, evaporation, transpiration and poultry. This year we have limited ourselves to poultry investigations, an account of which will appear in a Bulletin now in the hands of the printer. Owing to our extensive work in drainage, we have had to sacrifice our investigations in soils, evaporation, transpiration and other subjects. There are many important problems awaiting solution, and if the assistance previously suggested is given the department, we shall be able to carry on both the drainage and investigation work.

Respectfully submitted,

WM. H. DAY.

PART V.

THE PROFESSOR OF BOTANY.

To the President of the Ontario Agricultural College:

SIR,—I beg leave to present my second annual report of the work of the Botanical department.

The personnel of our staff has remained unchanged during the year. The services of Messrs. Eastham and Howitt have been steadily marked by efficiency, loyalty, and progressiveness. Mr. Eastham made an extensive acquaintance with our locality's flora during the vacation and worked over the herbarium collections. Mr. Howitt spent his vacation at Cornell University, making special study in grasses and economic plants, specially fitting himself for his work of teaching here.

The work of the department is allotted as follows:

First Year Botany. Fall Term, Prof. McCready.

Second Year Botany. Fall and Winter Terms, Mr. Howitt.

Third Year Botany. Fall Term—Plant Morphology, Mr. Eastham. Winter Term—Plant Physiology, Mr. McCready. Spring Nature Study Work, Messrs. Eastham, Howitt and McCready.

Fourth Year Botany. Fungi and Plant Diseases, Mr. Jarvis. Plant Physiology and Histology, Prof. McCready. Cryptogamic Morphology and Systematic Botany, Mr. Eastham. Grasses, Weeds, Economic Plants, Mr. Howitt.

In exchange for Mr. Jarvis' help in Plant Diseases, I take the Fourth year Vertebrate Zoology.

In addition, Mr. Howitt takes the short course in Weeds with the special winter class and has charge of the Information Bureau during the farmers' excursions in June. In all the work assistance is given to one another in laboratory and field work.

A considerable share of my time and interest has to be given to the consideration of the Nature Study Department, as may be seen by that part of my report. During the year I had charge of spring and summer sessions for the training of teachers in Nature Study. With the beginning of this term, there has been freedom in this branch of the work.

NEW EQUIPMENT.

During the year the department has added to its equipment (1) a series of colored charts imported from Europe from different publishers, for illustrating work in plant morphology; (2) a set of cardboard herbarium trays for the more convenient storing and handling of the plant specimens; (3) a set of boxes made on a unit system for the convenient storage of departmental supplies; (4) an assortment of the most important American and British texts in Botany for use as laboratory references, including a set of bound copies of the Experimental Station Record; (5) an assortment of general supplies for class use, comprising, brushes, sectioning razors, labels, dissecting needles, scalpels, glass slides, etc. (6) Besides the above it is expected that we may be able to find accommodation for practical work in Plant Physiology in the greenhouses recently erected for the Entomological department.

While the time and efforts of this department are chiefly spent in the direction of teaching, there is considerable correspondence relating to weeds and fungous diseases. Not infrequently this entails considerable investigation. This correspondence for 1907 has been summarized by Mr. Howitt and is included herewith. The report on the herbarium has been made by Mr. Eastham.

CORRESPONDENCE.

Several hundred letters have been received during the past year enquiring for information regarding weeds, weed-seeds and fungus diseases. These have been answered and a large number of plants identified. Numerous samples of clover, grass and other economic seeds, submitted to the Department for examination, have also been inspected and reported upon as to purity, etc.

TROUBLESOME WEEDS OF THE YEAR.

Judging from an analysis of the enquiries received during the past year the following weeds have been the most troublesome:

PERENNIAL SOW THISTLE (*Sonchus arvensis*). This pernicious pest seems to be rapidly spreading over the entire Province of Ontario, and in some localities appears to have got almost beyond control of the farmers. This is largely due to the fact that it spreads rapidly both by running underground root-stocks and by seed, which is carried long distances by the wind. Thus, though many farmers are constantly fighting it by means of smother crops, summer fallow, etc., they seem to make but little headway against it as their fields are being constantly re-seeded from the patches on the roadside or in careless neighbors' fields. Combined effort on the part of all the farmers in a district is absolutely essential for the eradication of this pest, as one or two neglected farms will contaminate a whole district.

BLADDER CAMPION OR COW BELL (*Silene inflata*). This is another weed which is gaining ground in Ontario, probably due to the fact that the seeds are often found in clover and timothy seed. It is a deep-rooted perennial and very hard to eradicate. Careful watch should be kept on all timothy and clover seed sown to prevent the introduction of this weed on to the farm.

FIELD MUSTARD OR CHARLOCK (*Brassica sinapistrum*). This is probably the best known of all our bad weeds, and every year numerous letters are received by the department concerning it. Though the past year has been no exception to the rule it does not seem to be spreading to any great extent except upon neglected farms.

COUCH GRASS OR TWITCH GRASS (*Agropyron repens*). This is another bad weed about which many complaints have been received, but which does not seem to be gaining ground on well cultivated land.

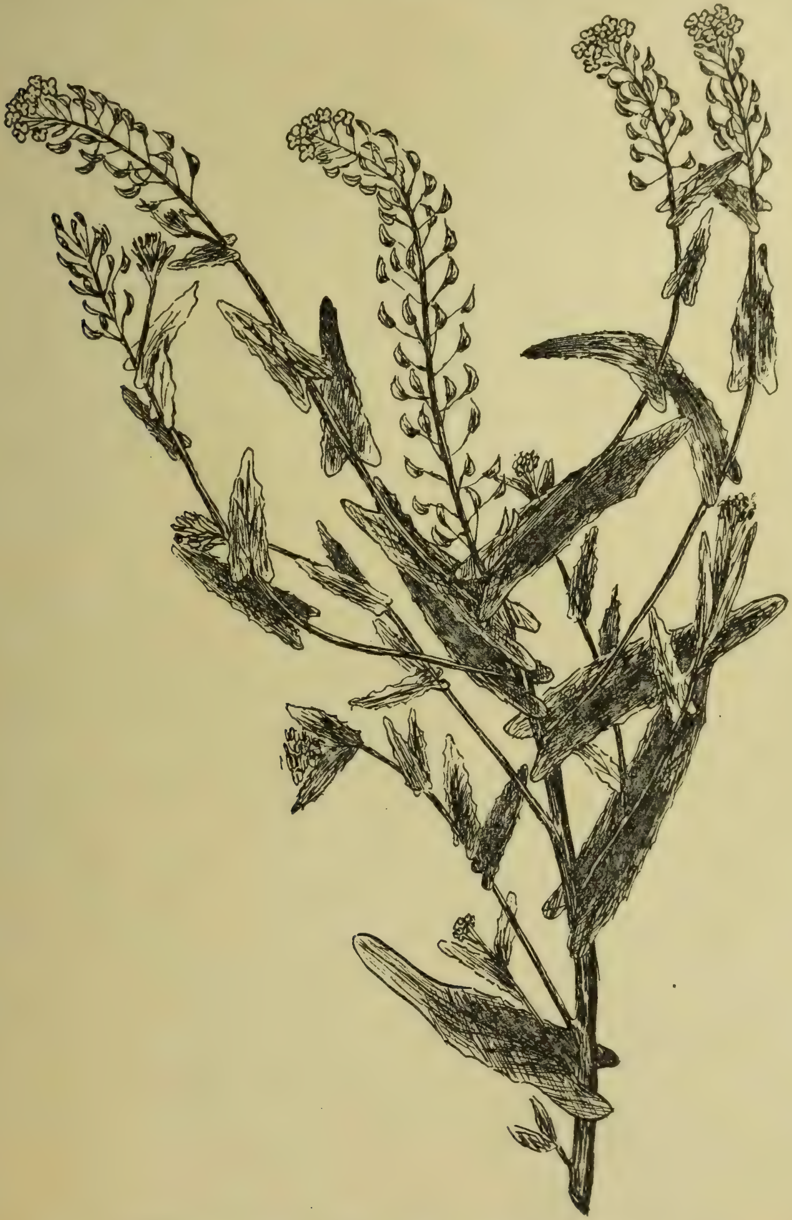
FIELD BINDWEED (*Convolvulus arvensis*). Though this weed is not spreading rapidly, correspondents report that wherever it is established it is almost impossible to eradicate it.

STINKWEED OR PENNY GRASS (*Thlaspi arvense*). This is a weed which is gradually being spread over the Province of Ontario and which farmers should be on the look-out for as it is a very free seeder and the seeds retain their vitality for a long time.

NEW WEEDS.

During the past year several plants have appeared in Ontario growing as weeds in farm crops which up to the present time have not been reported as troublesome.

One of these is the Field Peppergrass or Cow Cress (*Lepidium campestre*). This is a weed belonging to the Mustard Family introduced from Europe and up to the present time rare in Canada, occurring only in a few localities. This past season, however, specimens of it have been received by the department from various parts of the Province, and it now appears to be quite widely spread. It is an annual or biennial from 1-2 feet high, freely branching above. The lower leaves are oblong and entire. Those of the stem are spear-shaped, entire or slightly toothed, and clasping the



Field Peppergrass or Cow Cress (*Lepidium campestre*).

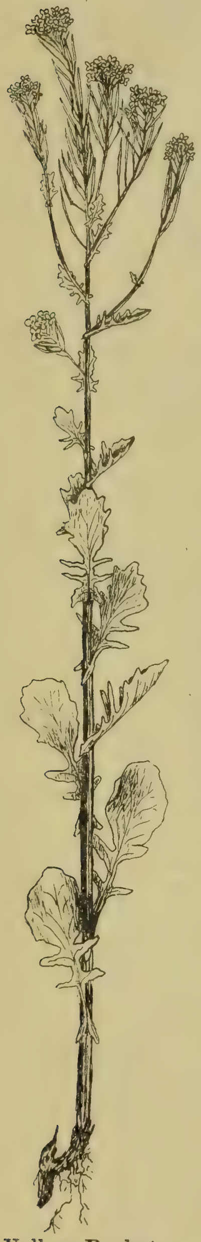
stem by their arrow-shaped bases. The seed pods are broadly ovate boat shaped, being rounded below and hollowed out above. They stand out stiffly from the stem on pedicels of about their own length. The seeds are reddish brown in color, about one-twelfth of an inch long, sharply egg-shaped, rounded or somewhat flattened, and the surface is granular and slightly scurfy.

Yellow Rocket (*Barbarea vulgaris*). This is another weed which has been reported as abundant in several localities in Ontario during the past year.

From the enquiries which we were able to make, it appears to have been spread as an impurity in clover seed. In many instances correspondents have mistaken it for Field Mustard or Charlock. It belongs to the Mustard family, but if observed at all closely it is easily seen to be very different from Charlock, which it resembles only in the color of the flower. It is not nearly so rough and coarse a plant. The leaves are smooth and shiny and dark green in color, somewhat oval in shape. The lower are petioled and much divided, the terminal division being much larger than the lateral ones. The upper leaves are sessile and slightly clasping. The seeds are somewhat flattened, and more or less oblong in form. They are light brown in color with a dull and roughened surface. This is an annual plant and should not be difficult to eradicate. It occurs very commonly in New York State, where it is not considered a serious pest.

Smaller Cat's Foot (*Antennaria neodioica*). Several complaints have been received that this plant was proving a pest in permanent pastures by spreading rapidly and crowding out the grass. It resembles somewhat the common everlasting flower (*Anaphalis margaritacea*), but is a much lower growing plant and flowers much earlier in the season. It is a perennial weed and grows in patches, spreading by runners and offsets. As a usual thing it is not troublesome except in dry seasons, when it seems to get ahead of the grass and choke it out. The exceedingly dry weather in some parts of the Province this past season is probably accountable for the fact that it was reported troublesome in several localities. It is not thought that in a normal season it will prove troublesome.

Narrow-leaved Sheep's Fescue (*Festuca tenuifolia*), Sun Spurge (*Euphorbia Helioscopia*), and Cow Cockle (*Saponaria vacaria*) are other weeds which have been reported as troublesome this season for the first time in Ontario, but not to the same extent as those described above.

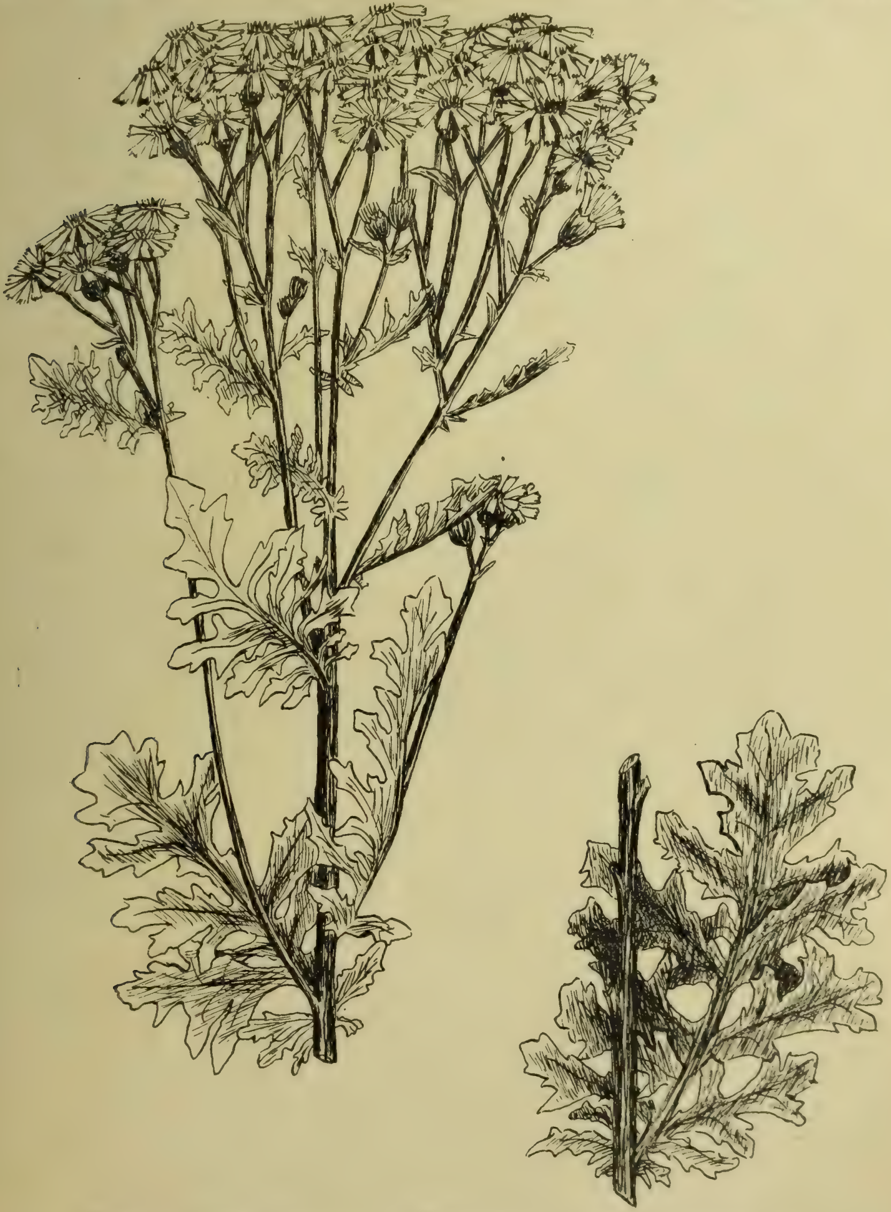


Yellow Rocket or Cress (*Barbarea vulgaris*).

Recent Introductions.

Eruca sativa. This is a weed which has appeared in Ontario for the first time this year, and which is likely to become very troublesome.

*It was first reported by Mr. J. Dearness, of London, Ont., who received it from a farmer in Elgin County. It had come to him and to a neighbor of his as an impurity in alfalfa seed. This fall this weed was brought to the department for identification by Mr. Groh, a fourth year student, who found it growing freely in an alfalfa field on his father's farm near Preston, Ontario. *Eruca sativa* belongs to the Mustard family, and at a little distance would easily be mistaken for Wild Mustard or Charlock which it resembles closely in size, habit of growth, foliage, and flowers. It requires, however,



Ragwort, Tansy Ragwort or Staggerwort (*Senecio Jacobaea*, L.)

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*Ottawa Naturalist, October, 1907.

only a glance to distinguish it. The leaves are more or less deeply pinnately lobed. The flowers are a light yellow, and the petals are distinctly veined with purple. When pods are present the plant can be known with certainty; for the upper third of these is a flat empty beak.

COMMON RAGWORT, TANSY RAGWORT OR STAGGERWORT (*Senecio Jacobaea*). This plant has been sent to the Department on two or three occasions from the neighbourhood of Guelph. It has probably been reported before as occuring in Ontario since it is mentioned in the official list of the Toronto Educational Department Herbarium, but as it is not recorded, to our knowledge, in any other list, it is for all practical purposes a plant new to the Province.

This is the weed which has caused so much trouble in the Eastern Provinces. It is a very dangerous weed because when eaten by cattle it causes a curious and fatal disease of the liver (Hepatica cirrhosa). For this reason farmers should keep a sharp lookout for it, and destroy it wherever it appears. It is easily recognized, being a large, conspicuous, strong growing plant, about two or three feet high. The flowers are in numerous heads in corymbose clusters, bright yellow in color and very showy. The root leaves are six to eight inches long, petioled. Stem leaves sessile and clasping, all leaves dark green, deeply twice pinnatified, the segments crowded and overlapping, crisped and waved. This being a short-lived, shallow-rooted perennial, it is not difficult to eradicate; all that is necessary being to cut it in time to prevent it from seeding for several successive years.

STINKING GOOSEFOOT (*Chenopodium Vulvaria*, L.) This plant is a native of Europe where it is found growing by roadsides and in waste places. It is mentioned in the list of plants of the Herbarium of the Toronto Educational Department as of reputed occurrence in Ontario, but no specimen had been collected. It may be regarded as a new introduction since it receives no recognition in the American floras. In duration it is an annual and in habit much resembles the common Lamb's Quarters (*Chenopodium album.*) It is, however, smaller, more diffuse and the leaves are quite entire. The character which leads most readily to its recognition is its foetid odour, which resembles decomposing fish and renders its presence highly objectionable. So far it has been found only in one locality, but here it was found growing in some quantity.

IMPORTATION OF WEED SEEDS FROM THE WESTERN PROVINCES.

During the year considerable attention has been drawn to the question of seed impurity in western grain. As these impurities are offered for sale for rough feed, a danger of wide infection arises throughout the province. In order to have some definite information available on the subject, samples of screenings were obtained from representative districts through the west and from Ontario millers who ship in western grain. The work of analyzing the samples has been carried on as thesis work by Mr. Gilmore, a fourth year student. In each case twenty grams of the screenings were used. It will be seen that the alarm sounded in the matter is justified, as the seeds are almost invariably those of noxious weeds.

No. of Weed Seeds in each Sample of 20 grams.

No. of sample	Source of Sample	Bindweed.	Hare's Ear Mustard.	Lamb's Quarters.	Wild Oat.	Pig Weed (Red Root).	False Flax.	Wild Sunflower.
1	Elevator, MacLaughlin & Ellis, Indian Head	280	113	886	27	167	13	7
2	Elevator, Glen, Indian Head	346	15	1667	2	157	....	1
3	Flour-mill, Wilson, Indian Head	556	27	302	4	74	1	259
4	Sherwood District, south of Regina	127	120	13	7	....	....	....
5	W. H. Graham, Pettapiece, north of Brandon	320	27	8507	13	2304	7	7
6	Elevator screenings, Moosejaw	625	75	425	...	450	....	25
7	Elevator screenings, Brandon	160	....	807	460	780	33	13
8	Manitoba screenings, Goldie Company, Ayr, Ont.	907	....	40	113	227	....	7
9	Manitoba screenings, Goldie Company, Galt, Ont.	932	20	273	107	1346	14	....
10	N. W. Screenings, Wolverton Company, Wolverton, Ont.	93	5	....	20	81	110	2
11	Elevator, Moosejaw	17	66	317	....	433	....	....
12	" "	51	....	589	....	384	....	....
13	" Dauphin, Man	37	....	273	390	242	26	....
14	" Giroux, "	411	....	2758	253	2274	63	....
15	" Portage La Prairie	881	....	2219	150	1608	19	....
16	G. Carter, Son & Co., St., Marys	1644	77	1450	67	1288	39	33
17	Goldie Co., Ayr	729	125	854	....	5614	83	31
18	Lake of Woods Milling Co., Portage La Prairie	1227	205	605	261	433	33	....
19	Man. screenings, Goldie, Guelph	620	6	20	47	87	6	....

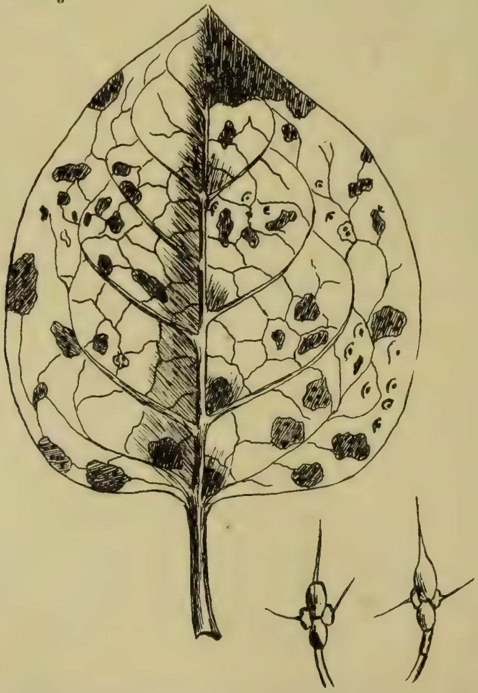
No. of sample	Stickseed.	Penny Cress.	Tumbling Mustard.	Chess.	Cow Cockle.	White Cockle.	Great Ragweed.	Perennial SowThistle.	Wormseed Mustard.	Corn Cockle.	Canada Thistle.	Ergot.	Russian Pigweed.	Charlock.
1	20	13	7	......	......	......	......	......	......	......	......	....	......	......
2	2	1	......	......	......	1	......	......	......	......	......	....	......	......
3	45	5	5	64	3	......	......	......	......	......	......	3	2	......
4	20	47	......	27	......	......	......	......	......	......	......	....	......	......
5	....	......	20	......	20	47	......	......	......	......	7	....	......	......
6	....	......	......	......	......	......	......	......	52675	......	......	....	......	......
7	40	......	......	......	......	33	13	......	......	......	......	....	7	......
8	....	......	27	......	......	......	11	6	......	......	......	....	......	......
9	6	......	66	......	......	13	......	......	......	2	......	....	6	39
10	3	3	......	1065	......	1	......	......	......	9	......	....	......	......
11	....	34	......	......	......	......	......	......	66834	......	......	....	......	......
12	....	......	......	......	......	......	......	......	69872	......	......	....	......	......
13	....	11	47..	......	......	......	......	......	5	1	......	....	......	......
14	....	68	27	......	79	37	84	26	263	......	......	....	......	......
15	....	31....	......	......	....	25	......	......	12	......	......	....	......	......
16	33	34	55	......	27	......	......	......	33	22	......	....	......	......
17	31	229	10	10	250	135	......	......	83	9	......	....	......	......
18	....	27	72	......	128	16	39	......	......	11	......	....	......	......
19	...	13	6	......	27	......	......	......	......	3	......	....	......	......

INJURIOUS FUNGOUS DISEASES OF THE YEAR 1907.

Very few attacks of fungous disease have occurred in the Province during the past year, only three or four diseases having been reported as doing any serious harm.

CROWN GALL (*Dendrophagus globosus*). This disease was very prevalent in the fruit growing sections of the Province during the past year, many peach trees and raspberry canes having been destroyed by it. It is by no means a new disease, as it has caused considerable loss in past years. The plants attacked by this disease show galls of soft, spongy, or corky tissue on the crowns of the root system or sometimes on the roots and stem. In the early stages these knots are the same color as the roots, but as they mature they become darker in color and rough and warty. They vary in size from that of a pigeon's egg to bunches as large as one's fist. Towards the end of the season these galls decay and fall away, and are followed by new galls the succeeding year on other portions of the roots. The plants affected with the disease become spindly, stunted, and sickly and soon die. The cause of the disease is an organism found in the tissue of the galls, belonging to the Myxomycetes or slime moulds. It is spread chiefly through the agency of infested nursery stock though there is evidence to show that it may spread through the soil for limited distances.

Treatment. The nature of the disease is such that no treatment can be applied, hence prevention is the only source of relief. Affected trees should be dug out and burnt and nursery stock carefully inspected before planting and all diseased trees rejected.



Pear Leaf Scald (*Entomosporium maculatum*) on Quince leaf.

PEAR LEAF SCALD (*Entomosporium maculatum*). Leaves affected with this disease were sent to the department by several fruit growers in the Niagara district, who reported that the foliage of their pear trees was badly damaged by the disease. Leaf Scald is very common wherever pear trees are grown and in some seasons causes considerable damage. The first indication of this disease is the appearance of red spots on the upper surface of the leaves; these increase in size and number and become brown with one or more black dots towards the centre. The injured leaves usually become yellow and brown and fall from the trees. Thus in severe attacks the trees are defoliated, the growth stopped, and the fruit severely injured. Generally a second growth of leaves takes place, but these are too late to properly mature the wood and hence the trees are very likely to suffer from winter killing.

Remedies: The results of carefully conducted experiments indicate that Bordeaux mixture properly applied will hold this disease completely in check.

ALTERNARIA BLIGHT OF GINSENG. Ginseng is a crop which is not grown to any extent in Ontario, though a few men are growing it as a special crop. During the past season complaints were received that the ginseng plants were being destroyed by a blight. Careful examination of the leaves affected revealed the fact that the cause of the trouble was a parasitic fungus in the tissues of the plant. This fungus proved to be Alternaria (species not yet determined). The blight caused by this organism is generally known as the Alternaria Blight of Ginseng. This disease is difficult to describe as it manifests itself in various ways, depending upon the part of the plant attacked. Spotting of the foliage is generally the first indication.* If examined early in the morning the diseased spots are of a dark green color and watery as if scalded. They dry rapidly, becoming papery and of a light brown color, definite in outline and very brittle. The disease progresses rapidly, especially in damp weather, so that in a few days the whole leaf wilts and hangs limp from the stalk. All parts of the top are affected though the disease never reaches the roots, affecting them only indirectly.

Remedy: Thorough spraying with Bordeaux mixture begun when the plants first come through the ground and repeated at frequent intervals will control the disease.

BLIGHTING OF OATS. In addition to the above there was a rather widespread physiological blight reported during the summer. The trouble was mostly in oat fields and specimens showed the upper parts of the plants as yellowing and dying. Investigation failed to disclose any causative fungi present. The trouble was very probably due to unfavorable weather conditions, the root system having been impaired by a continued cold spell following an earlier warm season, the plants were unable to get proper nourishment and water supply from the ground.

THE HERBARIUM.

During the past year the entire contents of the Herbarium have been overhauled. This work has entailed much labor, the results of which are not perhaps of a very conspicuous kind. An extensive herbarium, however, with the specimens reliable in their naming and easily accessible is absolutely essential for both reference and teaching purposes in the Botanical department of any college. Much accumulated material has been sorted over, those specimens which were serviceable allocated to their respective places and the rest removed. Every specimen in the collection has been diagnosed afresh from standard floras and specimens of undoubted accuracy, and the whole labelled, numbered, and indexed in accordance with the Harvard University Herbarium check-list, based upon Gray's Manual. Durable trays have been provided for orders, sub-orders, etc., to save the specimens and to facilitate handling. The number of compartments in the cabinets has been nearly doubled by the insertion of new shelves.

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*Bulletin—Alternaria Blight of Ginseng, by H. H. Whetzel, Assistant Professor of Botany, Cornell University, Ithaca, N.Y.

The herbarium is not perhaps very commodious nor conveniently located near our laboratories, but some common annoyances in connection with such collections have not been much in evidence. So far no trouble has been experienced from mite and insect infestation or from mildew, and it has not been necessary to dress the specimens with preservatives.

The total number of species and varieties of North American vascular plants represented in the Herbarium is about 1,400, and many of these are represented by a good series of specimens. Among the more important collections are those of Professor Macoun, Mr. W. C. McCalla (Plants of the Northern Rocky Mountains), the Entomological Society of Ontario, Halsted ("American Weeds"), as well as those made by various members of the staff. The most serious defect is the absence of any adequate collection of Western plants. As a number of the students,, however, come from the West, the nucleus of such a collection is being formed from the specimens submitted by such students as a portion of their practical work.

In addition to the above, the department also possesses some hundreds of Japanese specimens named by a reliable authority, and two fairly extensive collections of British plants. It may be urged that these are of little importance in this institution, but this is not the case. With the extension of commercial relations, new plants are continually being imported into this country to spring up sporadically at first, and if adapted to local conditions and left unmolested, to become established, perhaps as troublesome weeds. As examples of this introduction, we may mention the Asiatic plant, Hare's Ear Mustard (*Conringia orientalis*) now such a pernicious weed in the West, and the occasional occurrence of Indian Mustard (*Brassica juncea*) in our own neighborhood. This summer, too, an English plant, the Stinking Goosefoot (*Chenopodium vulvaria*), a weed with very offensive properties, was found growing in some abundance in a garden in Guelph. This plant is not recorded in our floras, and its identification would have been impossible without recourse to British floras or herbaria.

In the course of the ensuing year a valuable addition will be made to the section of non-vascular cryptogams in the shape of a representative collection of Lichens and Bryophytes prepared by Professor Macoun. The identification of these plants presents peculiar difficulties without authenticated specimens for comparison. They are not perhaps of economic importance, but they form the bulk of the herbaceous vegetation to be found during the spring course of Nature Study, and for this reason the collection alluded to will be a great help.

For the purpose of encouraging students to identify their own specimens by the judicious use of floras and type specimens, as well as to save the reference herbarium, two small collections have been prepared and placed so as to be of access to students. The one includes such wild plants as are of common local occurrence and the other those cultivated varieties which are grown either in houses or gardens for the sake of flowers or foliage.

In conclusion a list of some of the new plants acquired during the past year is appended:—

New Plants Added to Herbarium in 1907.

Eruca sativa, Mill. Preston, Ont.
Delphinium ajacis, L. (Small Larkspur). Aberfoyle, Ont.
Conringia orientalis, Dumort (Hare's Ear Mustard). Saskatchewan.
Physaria didymocarpa, Gray (Bladder Pod). Saskatchewan.
Chenopodium vulvaria, L. (Stinking Goosefoot). Guelph, Ont.
Astragalus Missouriensis, Nutt. (Missouri Milk Vetch). Saskatchewan.
Astragalus triphylles, Pursh. (Sessile-flowered Milk Vetch). Saskatchewan.
Oxytropis Lamberti, Pursh. (Stemless Crazy Weed). Saskatchewan.
Oxytropis splendens, Dony. (Showy Oxytropis). Saskatchewan.
Pentstemon gracilis, Nutt.. (Slender Beard-tongue). Saskatchewan.
Pentstemon cœruleo-purpurea, Gray. (Purple Beard-tongue). Saskatchewan.
Pentstemon cristatus, Nutt. (Crested Beard-tongue). Saskatchewan.
Mulgedium leucophæum, D.C. (Tall Blue Lettuce). Saskatchewan.
Psoralea argophylla, Pursh. (Silver-leafed Psoralea). Saskatchewan.
Glycorrhiza lepidota, Nutt. (Wild Licorice). Saskatchewan.
Erigeron cæspitosus, Nutt. (Tufted Fleabane). Saskatchewan.
Peucedanum villosum, Nutt. (Hairy Parsley). Saskatchewan.
Pholx Hoodii, Richards. (Hood's Phlox). Saskatchewan.
Helianthus petiolaris, Nutt. (Prairie Sunflower). Saskatchewan.
Viola Nuttallii, Pursh. (Nuttall's Violet). Saskatchewan.
Spartina gracilis, Trin. (Inland Cord-grass). Saskatchewan.
Spartina maritime, Scrib. (Smooth Marsh-grass). Nova Scotia.
Allium reticulatum, Fraser (Fraser's Wild Onion). Saskatchewan.
Bouteloua oligostachya, Torr. (Buffalo Grass, Mesquite Grass). Manitoba.

Respectfully submitted,
S. B. McCREADY.

PART VI.

THE PROFESSOR OF ENTOMOLOGY AND ZOOLOGY.

To the President of the Ontario Agricultural College.

Sir,—I have the honor to present my second report on the work of the department of Entomology and Zoology during the year. My colleague, Mr. Tennyson D. Jarvis, and I have carried out the course of lectures and laboratory instructions prescribed in the College Calendar. In addition to these specified duties, a considerable share of our time is taken up with answering enquiries, which come to us from all parts of the country, respecting noxious and other insects, naming specimens, collecting material for laboratory use, etc. The department is regarded by farmers and fruit-growers as a bureau of information on all matters connected with the attacks of insects and fungus diseases that affect plants of all kinds, and fruits and crops; our correspondence is, therefore, an important part of our work, and, judging from many letters received, is much appreciated.

COURSE OF INSTRUCTION.

In last year's report (1906) a detailed account was given of the course of instruction in the departments of Entomology and Zoology. As no changes have been made in this course, it is unnecessary to repeat the subjects of study and the time devoted to them by each of the student years. The object aimed at is to give those taking the short course of two years at the College instruction in elementary Zoology and a fair knowledge of economic Entomology; and to the students completing the full course of four years a systematic knowledge of Entomology and general Zoology and to make them familiar by study of specimens both out of doors and in the laboratory with the common insects that are injurious and beneficial, and with our native birds and animals of various kinds. In the final year the specialists in Biology and Horticulture receive individual attention and are directed in a scientific study of various orders of insects and microscopical work.

During the month of June a series of lectures was given to the Nature Study class of teachers from the Eastern Provinces, and in July to the Summer School of Ontario teachers.

A series of lectures was also given to the Senior Normal Class of the Macdonald Institute on the structure and physiology of plants and animals; this course extended throughout the College year.

In connection with the course of instruction some useful scientific work is being carried on by students who have taken up Entomology as the subject of the theses they are required to present at the close of the fourth and second years. Mr. H. A. Wolverton (4th year) is studying Insects and Fungus Diseases attacking wild plants belonging to the order Rosaceæ. Mr. H. Groh (4th year) is conducting a series of careful experiments in greenhouse fumigation against the White-fly and other insects. Mr. L. Caesar (4th year) is making a study of the Lime-sulphur treatment for Scale insects. Mr. R. C. Treherne (3rd year) is studying the Parasitism of Galls, including inquilines and the natural checks of the increase of Gall flies. Mr. W. R. Thompson (3rd year) has taken up the study of the Analgesidæ, or Bird Mites; Mr. A. J. Logsdail (3rd year) the Insect and Fungus parasites of Scale insects in Ontario; Mr. C. H. H. Ward (2nd year) a study of the Siphonaptera in Ontario; Mr. E. W. Stafford (3rd year) the genus Pseudococcus in Ontario, and Mr. R. Fraser (2nd year) the Cynipidous Gall-flies.

CORRESPONDENCE.

The number of enquiries respecting a great variety of injurious insects has largely increased, being more than double the number received during the corresponding period of last year. These have all been carefully considered and fully replied to; in some cases the questions concerned unfamiliar and obscure forms, and it became necessary to devote to them a good deal of time and research. The daily attendance of a stenographer has been of great assistance in facilitating this branch of our work.

The following are some of the more important insects about which enquiries were made, owing to their ravages and abundance: Scale Insects have attracted more attention this year than ever, and specimens of a variety of species have been sent in for identification. The Oyster-shell Bark-louse (*Lepidosaphes ulmi*) has been a constant subject of enquiry from one end of the Province to the other. Owing to neglect in the past, it is a widespread and serious injury to apple and other trees, and should receive careful attention by every fruit-grower. The lime wash applied after the leaves fall in late autumn is a most effective remedy if properly done.

The San Jose Scale (*Aspidiotus perniciosus*) is gradually spreading from its centres of infestation in the Niagara fruit district and the counties of Essex and Kent owing to the carelessness and indifference of some fruit-growers. Specimens were this year received from Aylmer in the county of Elgin. There is no doubt that it can be kept in control by the use of the lime-sulphur wash, if it is properly made and thoroughly applied.

In addition to these two familiar scales, we have received samples of the Scurfy Bark-louse (*Chionaspis furfurus*), the Forbes and Putnam's scales attacking fruit-trees, *Diaspis rosæ* on blackberry, the Terrapin (*Eulecanium nigrofasciatum*) and the *Pseudococcus aceris* on Maples. The Cottony Maple-scale (*Pulvinaria innumerabilis*) has ceased to be abundant and in all probability will not be a serious pest for some years to come.

Many complaints have been made of the ravages of Wireworms and White grubs, the larvæ of Click-beetles (*Elater*) and May-beetles (*Lachnosterna*) respectively. For these underground root-feeders it is most difficult to find any effective remedy; the only satisfactory method of dealing with them is to break up their breeding places in old pastures and carry out a proper system of rotation of crops. This applies also to the Rose-beetle (*Macrodactylus subspinosus*) which in its adult stage is so injurious to the blossoms of grape vines and to many flowering shrubs and plants. It was reported from several new localities this year, but on the whole does not seem to have been as abundant as usual.

Several species of Plant-lice (*Aphis*) have been excessively abundant this year. The so-called "Green Bug," which received wide-spread notice in the newspapers throughout the States to the south and west of us, and was regarded with no little consternation, was reported to us from only one locality in Ontario, a wheat field near Toronto. Our common grain aphis, which attacks the ears of the wheat, was somewhat abundant in several places through the southern districts of the Province. But the most serious and widespread attack was made by the well-known species which is found late in summer and during the autumn in enormous numbers on turnips and cabbages. It seemed to have been everywhere prevalent this year and to have inflicted a great deal of damage upon these two crops.

Among insects affecting fruits may be mentioned the Grape-vine Flea-beetle, the Plum Curculio, Pear-tree slug, Eye-spotted Bud-moth, Raspberry borer and girdler, Tree-crickets and the Shot-hole Borer (*Scolytus*), which were all prevalent during the past season.

Mention may also be made of the Raspberry Root-gall, the result of a fungus disease, which appeared in a number of places and inflicted considerable damage.

Garden crops were attacked by the Tarnished and Four-lined bugs, the Striped Cucumber-beetle, Cut-worms, Red Spider, Cabbage and Onion Root-maggots, Strawberry Weevil, Asparagus beetles, etc., but these are our annual enemies against which we must always expect to wage war.

Amongst other insect attacks may be mentioned the Spruce Gall-mite which is a wide-spread injury to these favorite ornamental trees; the Bronze Birch-borer; the Pigeon Tremex and the Flat- and Round-headed borers (*Dicerca divaricata* and *Plagionotus speciosus*) which are injuring Maple trees in the streets of Guelph, Woodstock and other places; and the Buffalo beetle which causes so much dismay to the careful housekeeper. From three different places has come a complaint of a curious invasion of houses by myriads of a minute mite (*Bryobia pratensis*) which usually feeds upon clover and foliage; these tiny creatures seem to have come indoors to seek shelter and obtain comfortable winter quarters; though they would not be likely to injure anything in the house, their presence in multitudes was extremely unwelcome. Another singular trouble was the presence of a malodorous beetle (*Nomius pygmæus*) which in one case made itself known by an insufferable odour that penetrated the whole dwelling and drove out the legitimate inmates. Hapily this is a very uncommon visitant.

There remains to be recorded a most unusual and remarkable outbreak of Cutworms which deserves a fuller description.

Remarkable Outbreak of Cutworms.

In July much alarm was created in the neighborhood of Leamington, Ontario, by an extraordinary outbreak of caterpillars which devoured everything before them. Application was made to the President of the College for advice and assistance, who referred the matter to the Entomological department; Mr. L. Caesar and Mr. McMeans were at once sent up to investigate. The latter brought back specimens the following day, and the insect proved to be the Variegated Cutworm (*Peridroma saucia*), which has on previous occasions appeared in devastating numbers, the most serious outbreak having occurred in British Columbia and the neighboring Pacific coast States in 1900. Near Leamington the worms were first discovered in clover fields where they soon devoured the crop and left the ground bare and black; they then marched on to the next field and consumed whatever vegetation they met with, corn and tobacco, tomatoes and other vegetables, seemed especial favorites for consumption. If a fruit-tree happened to be in their way, they climbed it, and devoured both fruit and foliage; many peach trees were thus attacked and the fruit ruined.

Like other cutworms these caterpillars feed only at night and remain in concealment during the day, hiding in the ground where the soil is loose and under any rubbish or other shelter that they can find. When full-grown the worm is about two inches long, with a yellowish stripe on each side above the legs, the rest of the body is darker and mottled with black, white or grey; the most characteristic feature is a row of yellow or white spots, five to seven in number, along the middle line of the back. Some were already changing into the chrysalis stage, for which purpose they bury themselves in the ground and form there an oval earthen cell. The moth, into which they finally turn, has a wing expansion of about an inch, and is dark blackish brown in color, often clouded with red towards the front margin of the wings, but with no conspicuous or distinguishing markings; the underwings are white with a pearly lustre. Like so many other of our most destructive insects, this one has come to us from Europe.

Mr. Caesar was able to allay the alarm caused by this strange outbreak by suggesting simple and effective remedies. Where the caterpillars were migrating from one field to another their progress was checked by ploughing a deep furrow across their line of march and boring a post-hole in it at short intervals; the worms fell into the furrow and being unable to climb up the steep friable side they moved on until they dropped into the post-holes. In these large numbers were found in the morning and easily destroyed. Where the worms were already in a field or garden, they were checked by the use of the poisoned mash made of half a pound of Paris green mixed with 50 lbs. of flour which had been sweetened with molasses; bran is usually employed but could not be obtained. The cutworms eat this mixture in preference to the vegetation, and perish in large numbers. Full particulars for making the mash and directions regarding other methods were printed in leaflet form and widely distributed in that part of the country. Subsequently a Press Bulletin was prepared, and sent to all the country newspapers in Ontario west of Toronto, and to many of the city dailies; it was satisfactory to find that it was printed in the majority of instances, and thus the best methods of dealing with the outbreak were made known far and wide.

We have been gratified to learn that the farmers in the district about Leamington expressed themselves as deeply thankful for the prompt assistance that they had received from this department of the College.

During the next few weeks complaints come in from all parts of Ontario, west of Toronto, regarding ravages of these cutworms. Green tomatoes were bored through and through; choice flowers, such as gladioli, tuberous begonias, etc., which are usually free from insect attack, were in many places almost destroyed, while garden vegetables and field crops were seriously injured. To most correspondents the attack was a mysterious one: as the worms feed at night and hide away in the day time, the depredator was not to be seen and they did not know what caused the destruction they deplored.

Spraying to Kill Mustard.

On June 28th, Mr. Jarvis was invited to visit the farm at Woodstock in connection with the Hospital for Epileptics, where he found a large field of oats overrun with mustard. The oats were about six inches high and the mustard was in full bloom. Careful directions were given when and how to spray and where to purchase bluestone and the necessary sprayer. The results following the treatment were highly satisfactory.

A Visit to Professor Goldwin Smith's Garden.

On July 15th, Mr. Jarvis visited the gardens of Prof. Goldwin Smith, Toronto, for the purpose of determining the insects attacking his vegetable crops respecting which he had written for information. He found

Aphids and a few other insects on the beets and cabbages and recommended spraying with kerosene emulsion for the aphids. The directions he gave were carefully carried out and the results were very satisfactory.

PUBLICATIONS.

In addition to editing the "Canadian Entomologist" and the Annual Report to the Legislature of the Entomological Society of Ontario, I have prepared the following articles for publication:

O. A. College Bulletin No. 158, "Insects Affecting Fruit Trees." A second edition of this Bulletin has been also prepared and sent to the Department of Agriculture for publication; it has been much enlarged by the incorporation of "Fungus Diseases of Plants" by Mr. T. D. Jarvis.

"Injurious Insects of 1907 in Ontario," Annual Report of the Entomological Society of Ontario.

"Remarkable Outbreak of Cutworms," the Press Bulletin already referred to.

A series of short articles in the Farmer's Advocate replying to enquiries respecting a number of insects. Articles of a similar character in the Farming World, the Canadian Horticulturist, the Toronto News, London Advertiser, and the Toronto Weekly Sun.

Mr. Jarvis has made the following contributions during the year:

"Fungus Diseases affecting Fruit-trees" forming part of the new edition of the Bulletin on Insects affecting Fruit-trees.

"Some Additional Insect Galls of Ontario," and,

"The Scale Insects of Ontario," Annual Report of the Entomological Society of Ontario.

"Nature Study Work at the Guelph Central Exhibition" published in the Guelph Herald and Mercury, the Farmer's Advocate, and some other newspapers.

He has also edited the "Ontario Natural Science Bulletin; the Journal of the Wellington Field Naturalists' Club" for 1907.

FIELD EXPERIMENTS.

A number of field experiments were made by Mr. L. Caesar, with lime-sulphur, in order to discover more about its efficiency as an insecticide and fungicide, and the best way to make it. Over 550 gallons of the mixture were put on trees of different kinds at different dates. The following is a brief summary of the most important results so far obtained:—

(1) To bring about the necessary chemical combination of the lime and sulphur most rapidly, the mixture should be boiled in about 13 gallons of water. If the boiling is vigorous 45—60 minutes will be sufficient time.

(2) The color obtained at the end of this time depends almost entirely upon the kind of lime used; for instance, Port Colborne lime gives a dirty dark green, Guelph a greenish yellow, or an orange yellow with a green shade in it.

(3) The wash should be kept well stirred when being put on the trees because actual tests showed that the red supernatant liquid was not quite so effective as the denser liquid beneath. There was a difference of several per cent. in favor of the latter and of the well mixed liquid.

(4) Late spring spraying was doubly as effective for Oyster-shell scale, at least, as early spring spraying. The spray should be put on just before, or better when, the buds ,are bursting. Very little injury is done to apples, pears or plum trees even when the buds are almost fully opened.

(5) A rain shower coming immediately after the spraying, before the wash has time to dry, renders it useless, but if the wash has once dried it will stand a rain very soon afterwards. Spray should not be put on when the trees are wet.

(6) Oyster-shell scales were very little injured by early spraying but a large proportion of them were killed by the late spraying, that is, at the time when the buds were half-opened. Flour-kerosene or kerosene emulsion applied just after the eggs have hatched gave rather better results than lime-sulphur. On the whole, however, the results of late spraying against the Oyster-shell scale were fairly satisfactory.

(7) The New York Plum scale (*Eulecanium cerasifex*) was killed whereever the spray covered it. Very careful spraying of the underside of the branches is necessary to kill all these insects.

(8) About 50 per cent. of the aphids which had hatched out a few days before the spraying was done were killed. The rest escaped the spray by being concealed among the tiny leaflets in the opening bud. Further experiments have just been performed to test more accurately whether the spray kills the eggs of aphids. It is too soon yet, however, to determine the results. A great deal of difference of opinion exists among fruit-growers on this point.

(9) Bud moths were quite uninjured so far as could be determined.

(10) It was impossible to determine the effect upon fungus diseases because Bordeaux mixture was used later in the season on the same trees.

(11) The formula recommended is still 20 lime, 15 sulphur, 40 water, or 22, 18, and 40. The latter is slightly superior but somewhat more costly.

(12) The lime that was the most satisfactory to spray with because of its tendency not to settle to the bottom so rapidly as others was that procured from Port Colborne. However, the other kinds of lime used gave good results, but somewhat more care had to be taken to see that these were kept well stirred.

EXPERIMENTS WITH (a) AIR-SLAKED LIME; (b) ROAD DUST TO DESTROY ASPARAGUS BEETLES.

Ordinary air-slaked lime was dusted carefully over the grubs of the beetles but the effect was very unsatisfactory. Road dust used in the same way also gave a poor result.

EXPERIMENT WITH ARSENITE OF LEAD TO DESTROY ASPARAGUS BEETLES.

A sample of Arsenite of Lead sent us by the Sherwin-Williams' Co., was used on the Asparagus beetles in August. The result was quite satisfactory. Practically all the adults and larvæ were killed. The eggs of course were not injured so that the dose had to be repeated some days later.

BANDAGING FOR CODLING WORMS.

The Codling worm here has been well controlled in the orchard by spraying with poisoned Bordeaux. A few trees, however, on the campus were left unsprayed. Bandages were put around two of these and removed at least once every ten days. Between July 20th and September 28th, 295 Colding worms were captured in this way. Of these 5 per cent. emerged, showing that we had here this year at least 5 per cent. of a second brood.

EXPERIMENTS WITH KEROSENE EMULSION TO DESTROY THE OYSTER-SHELL SCALE.

Mr. J. W. Crow reports as follows:—On June 20th two apple trees badly infested with Oyster-shell scale were sprayed with 11 per cent. flour-kerosene emulsion. The young insects had been on the move for several days and many were still running. The mixture was prepared according to the formula recommended by Macoun, viz., 5 pounds flour, 5 gallons kerosene and 40 gallons water. One-half pound flour was placed in the tank of the hand spray-pump. This was scalded with a couple of pints of boiling water and then thoroughly mixed into a paste in order to break up all lumps. One-half gallon of kerosene and two gallons of water were then added and the pump was again placed in position in the tank. The mixture was thoroughly churned by forcing it through the pump and back into the tank, using a Friend nozzle. Agitation was continued for ten minutes. Water was then added to make four and one-half gallons and after a second mixing the preparation was applied to the trees. Very thorough application was made, and the liquid dripped freely from the leaves.

Two other trees were sprayed with soap-kerosene emulsion prepared according to the ordinary formula of kerosene, 2 gallons; water, 1 gallon; soap, ½ pound. One-quarter pound of Sunlight soap was boiled and thoroughly dissolved in ½ gallon water. The whole was added to 1 gallon of kerosene and thoroughly churned in the manner described above. A creamy mixture resulted which spread evenly on clean glass without showing any separation of oil. Sufficient of this stock solution was added to 4 gallons of water to make a 7 per cent. kerosene emulsion. The ease with which this stock solution mixed with and remained in suspension in water was very noticeable. A sample of each emulsion was placed in a small glass vessel. The soap-kerosene showed an even distribution throughout at the end of 24 hours, while an inch of thick, cheesy material gathered at the top of the flour-kerosene in five minutes, leaving the remainder of the vessel practically clear. Neither sample, however, showed any actual separation of oil for at least two days.

The applications were made at mid-day in bright, warm weather. No injury was done to the foliage and at no time during the summer could any considerable number of live insects be discovered. It is estimated that at least 85 per cent. of the scale was destroyed, and the result is looked upon as being highly satisfactory. The actual cost for labor and materials of preparing these mixtures on a commercial scale remains to be determined.

EXPERIMENTS WITH HYDROCYANIC ACID GAS.

Mr. H. Groh reports as follows:—The appearance of the White-fly (*Aleyrodes vaporariorum*) at the College greenhouses a couple of years ago, and its rapid increase to almost serious proportions as a pest, has caused the question of greenhouse fumigation with HCN (Hydrocyanic acid) gas, to become a live one here. Work against the White-fly at other stations has so generally demonstrated the efficiency of this remedy, that it has come to be regarded as the specific for this particular insect. The results of the first attempts at its use here, however, proved so uncertain, and even contradictory, that the need was felt for a fuller knowledge of the conditions essential to success than was obtainable from the literature on the subject. As a consequence, the experimental work briefly outlined below was undertaken last spring.

Among the points upon which it was sought to secure data are: the effect of temperature, sunlight, moisture, and other influences, on the resisting powers of plants to the gas, and the susceptibility of the White-fly and other insects to the gas; so that from these considerations a strength of the gas might be found which could be relied upon to kill the fly, without being too close to the danger limit for the more tender plants. Observations were also made on the ability of the various greenhouse plants to withstand the effects of HCN gas.

The amount of time which I have been able to give to this work has been altogether incommensurate with the extent of the problems; and, as much of the first work had necessarily to do with questions which had been investigated, to some extent, at least, at other places, the new information gained may seem somewhat meagre. Then, too, where it does not coincide with the results obtained by others, it should be supported by further experiment before being opposed too confidently against those results.

The experimental work done consisted of a series of 37 box fumigations, and 10 of greenhouses. The former was carried out partly as a preliminary to greenhouse fumigation, and partly on account of its convenience for securing known conditions and exact results. A tight box was used which enclosed 16 cubic feet of space, and had two sides of glass through which to observe the insects. In this series of tests the doses used ranged from .0035 g. to 2 g. per cu. ft. of 98 per cent. KCN.; the length of exposure varied from 5 to 60 minutes; and the temperature from 50° F. to 65° F. Work under greenhouse conditions has been mostly so far in all-night exposures to weak strengths of the gas—from $\frac{1}{4}$ to $\frac{3}{4}$ of an ounce of KCN. per thousand cubic feet.

A few of the results and conclusions from these experiments will be briefly enumerated.

Of the common greenhouse pests, the White-fly proved to be by all odds the most susceptible to the gas. Next in the order given were the black aphis, green aphis, ant, mealy bug and red spider; the two latter being rarely, if ever, killed even by the strongest doses. The weakest gas to which the White-fly succumbed was that generated from .007 g. KCN. per cubic foot; and with the strongest gas used, namely .2 g. per cubic foot, it dropped in from one to two minutes. The green aphids and ants usually dropped also, sometime after the White-fly, but in most cases recovered within a few hours after removal from the gas. It is a very interesting fact on the other hand that the aphis is susceptible to tobacco preparations such as "aphis punk," and the White-fly recovers from these just as readily as the aphis does from HCN.

The box experiments seem to indicate a much wider margin (for box conditions at least) than was expected, between what will kill the fly and what will injure the tender plants.

The greenhouse experiments also go to prove that the White-fly can be controlled without the use of large amounts of the gas, which endanger the plants. The gas from a quarter to half an ounce of KCN. to 1,000 cubic feet, left over night, has given uniformly satisfactory results in killing practically all the adults. The nymphs require stronger amounts of the gas. Of the conditions which increases the danger of injury to plants, direct sunlight is undoubtedly the most important. A high temperature is also to be avoided. A dose which gives good results at 55° F. may do much injury to some plants at temperatures above 60° F. Moisture on the plants, or the humidity of the room, has not been proved to have any marked influence.

Plants show a great variation in their powers of resistance to the gas. Among those found most easily injured are the following: Tomato, Pineapple, Salvia, Pilea, Tradescantia (striped one only), scented Geranium, scented Verbena, Ageratum, Salvia. In this connection it is interesting to note that a considerable proportion of the plants which exhale an odour or fragrance when bruised have been found among the most tender plants. It is also a point of some interest that scarcely any two species of plants showed injury in exactly the same way. The majority of them were injured most about the younger parts, but there were exceptions to this.

The Fall Fairs.

During last summer the Ontario Government appointed a graduate from the Ontario Agricultural College to the staff of each of six of our high schools, or Collegiate Institutes, in different parts of the Province. The six men chosen for the purpose spent part of the summer at the College preparing themselves more fully for their work. While here they unanimously requested that the Entomological Department should provide them with an exhibit which could be used at the fall fairs in their respective counties. The object in view was to use the exhibit as a means of attracting the attention of the farmers and thus getting better acquainted with them; and it was also thought that the exhibit would have a valuable educational effect. President Creelman granted the request, and an exhibit, or rather, two exhibits were prepared, because in some cases two fairs had to be attended on the same days.

The following is a brief outline of the composition of each exhibit:

1. Four cases of insects, each case about two feet long by one and one-half feet wide. Though these cases were meant chiefly to make a good background and attract attention, care was taken that as many as possible of our common species of insects were represented in them, so that they could be used as a reference in answering questions. One of these cases contained specimens of most of our native Ontario butterflies, and also of our largest and most attractive moths; another case was composed entirely of moths; and the other cases were representatives of the other orders.

2. Six smaller pasteboard cases of insects. These cases were filled with sheet cotton-batting, on which the insects were placed and a glass cover put on to keep them in position without in any way concealing them. One of these was entitled "SOME OF OUR MOST BENEFICIAL INSECTS" and included such specimens as Honey Bees, Bumble Bees, Ichneumons, Tachina and Syrphus Flies, Ladybird Beetles and their larvae, and Lacewinged Flies. Four of the other cases were headed "SOME OF OUR INJURIOUS INSECTS" and represented, so far as opportunity permitted, life-histories of the Codling Moth, Tussock Moth, Apple-tree Tent-Caterpillar, Variegated and other kinds of Cutworms, Wireworms, Pea Moth, Pea Weevil, Plum Curculio, June Beetle, both kinds of Asparagus and Cucumber Beetles, Round and Flat-headed Borers, Potato Flea Beetle, Buffalo Carpet Beetle, Red-humped Caterpillar, Buffalo Tree-hopper, Tarnished Plant Bug, and Squash Bug. The remaining case contained samples of six of our most common and most injurious scale insects, viz., Oyster-shell, San José, New York Plum, Scurfy, Cottony Maple, and Pine-leaf scales.

3. Six or eight cases of common fungus diseases such as Late and Early Blight of Potatoes, Apple Scab, etc.

4. Thirty of our most noxious weeds, mounted on standard sized sheets.

5. Dominion Seed Case, containing one hundred seeds, among them those of all the above thirty noxious weeds.

6. Seven flat vials, containing the life history of the frog. (This went with only one of the exhibits.)

7. Samples of Bordeaux Mixture and of the Lime-sulphur Wash.

All the specimens, except those in the large show-cases, had carefully prepared typewritten labels beneath them, giving the name and a brief note on the nature and habits of the specimen. Mr. Jarvis, Mr. Caesar, and Mr. Crow divided the work of attending the fairs and helping the local agricultural representative. Mr. Jarvis attended the Perth and Collingwood Fairs; Mr. Caesar went to Morrisburg, Winchester and Lindsay; Mr. Crow to Essex.

At each place a suitable part of the agricultural pavilion or hall was reserved and was neatly fitted up with cheese-cloth and bunting with the object of making the exhibit the centre of attraction. Placards were also used to indicate the nature of the exhibit and its source.

It was very noteworthy to see the interest the exhibit aroused among the farmers: from morning till night both the College and local representatives were kept busy answering questions about noxious weeds, injurious insects, and other agricultural subjects that naturally arose.

In regard to weeds it was found that while almost every farmer seemed to be much interested in the subject, a number of them had but little idea of the names of even our commonest weeds; for instance Perennial Sow Thistle was often spoken of as Ox-eye Daisy. From the numerous weeds that were on view before them and from the use of the excellent book "Farm Weeds" recently prepared for the Dominion Department of Agriculture by Dr. James Fletcher, we were able to do much to help the farmers to recognize what weeds were the most injurious and also to suggest to them methods of eradicating not only these weeds but weeds in general.

Those chiefly inquired about in Eastern Ontario were the Perennial Sow-thistle, Couch Grass, Ox-eye Daisy (bad in some districts), Wild Mustard, Blueweed, Canada Thistle, Wild Vetch, or Wild Pea, Bladder Campion (especially around Lindsay), Curled Dock, Ragweed, Wild Oat and Bindweed. It is worthy of note that Bindweed, perhaps our most difficult weed to eradicate, is creeping in all over the Province, though as a rule it has not got a very extensive footing on the individual farms yet. Perennial Sow-thistle will soon be almost as common as the Canada Thistle and is causing much anxiety to the farmers.

In Western Ontario practically the same weeds are asked about with the addition of Rib-grass (*Plantago lanceolata*) or buck-horn as it is often called.

While on the one hand questions about weeds were in the majority in the districts east of Toronto, on the other hand at Collingwood and Essex, fruit growing districts, questions about insects and fungus diseases were the more common.

In the Eastern districts, however, a good many questions were asked concerning the following insects: Grasshoppers (Locusts), Red-humped Caterpillar, Cabbage Worm, Potato Beetle, Turnip Flea Beetle, Fall Webworm, Oyster-shell Scale, Aphids of various kinds, White Fly, Maple Borers, Wireworms and Buffalo Carpet Beetles. Inquiries were also made about Pear Blight and the fungus diseases known as Early and Late Potato Blights, and Apple Scab.

Throughout the Eastern district very little spraying of any kind seems to be done in orchards except in the splendid apple orchards along the shores of Lake Ontario.

In the Western districts almost every kind of injurious insect was brought up at one time or another for discussion, among them being the San José and Oyster-shell scales, Codling Moth, Aphids, Plum Curculio, Variegated and other Cutworms, White Grubs, etc., etc. Most of the common fungus or bacterial diseases attacking fruit trees or vegetables were also inquired about, and many questions were asked concerning the proper way of making spray mixtures. It was disappointing however, to find a large number of fruit-growers doing absolutely nothing to check some of the worst of our insect pests, such as the San José Scale and Codling Worm. Farmers of this class, we are glad to say, are becoming fewer each year.

In addition to the exhibits mentioned above, Mr. Jarvis took a much larger one to the Toronto Exhibition at the end of August and again to the Fruit and Flower and Honey Show in November. At the latter of these especially he was constantly kept busy answering questions in regard to almost every insect and fungus disease that he had represented and that was to be found in fruit-growing districts.

While much of the work done this year at the different fairs was almost wholly an innovation, yet it revealed a field in which there lie great possibilities for the future. The interest taken by the farmers in the exhibits shows that a great deal of much needed information can be given in an attractive and convenient way by some such method as the one used this autumn.

The farmers, however, were not the only persons who took an interest in the exhibit; at every fair a large number of teachers who had taken up Nature Study spent a good deal of time examining the insects and getting information on many points in which the entomologist could help them. In some cases they brought interested pupils to see insects with which they were not previously familiar, and asked the instructor to show the pupils how the cyanide bottles were made and the insects prepared for mounting.

But it was not the public alone that were learners. Those in charge of the exhibits felt that their intercourse with the farmers and others had taught them many new and valuable ideas, and helped them to get closer into touch with the agriculturists of the Province, and so to be able to fulfil better the ideals of usefulness that they have before them.

Lecture in Toronto. On the evening of November 13th, Mr. Jarvis addressed the members of the Ontario Fruit Growers' Association on Fruit Insects in Victoria Hall, Toronto. The following species were discussed: Apple Maggot, Pear Leaf-blister mite, Fruit Bark Beetle, Codling Moth, Fall Webworm, Apple Aphis, American Tent-caterpillar, Red-humped Caterpillar, Cankerworms, San José Scale, Peach-tree Borer and Codling Moth. Most attention was given to the Apple Maggot and the Codling Moth. The Apple Maggot is spreading in Western Ontario and is likely to become a very destructive pest. The Codling Moth seems to be increasing from year to year. Some of the fruit growers have had good results from spraying while others gave very unsatisfactory reports.

The Insectary. It has been a great disappointment to us that the new glass-houses have not yet been completed, and that we are unable to make any use of the Insectary which should be a very great help in the carrying on of experimental and research work. We hope next year to conduct many investigations in parasitism, fungus diseases of insects, breeding and tracing out life histories, and artificial methods of repressing injurious species, for which we have at present no facilities or equipment. The Insectary should furnish all needful space and the proper conditions for work of this kind.

THE MUSEUM. In the Natural History department not much has been done during the past year. A pair of Turkey Buzzards, taken near London, have been added to the collection of native birds, and a number of small mammals have been secured through Mr. J. A. Morden, of Hyde Park Corners, who is an enthusiastic naturalist and an experienced collector. It is hoped that before long there may be a complete series of examples of all the smaller animals of Ontario. The collection of Insects is being steadily improved and increased.

ENTOMOLOGICAL SOCIETY OF ONTARIO.

The headquarters of this Society have now been established for a little more than a year in the Ontario Agricultural College. Its valuable library, and extensive collections have proved most useful in the Biological work of the College, and are constantly referred to by the teaching staff and the more advanced students. Two general meetings of the Society have been held, the first at the beginning of July when those who came from a distance were hospitably entertained in the College buildings through the kindness of the President. A number of papers were read and discussed, and addresses were given by Dr. Fletcher of Ottawa, Dr. Henry Skinner of Philadelphia, and Mr. Nash of Toronto. The attendance included the Summer School of Ontario teachers and the students who were still in residence. The second day was devoted to an excursion to Puslinch Lake, where interesting collections were made and short addresses given by the leaders on the insects and plants that had been found.

The regular annual meeting of the Society was held on October 31st and November 1st. The two days were fully occupied with addresses and discussions on fruit-tree insects and others of economic importance, together with some papers of a more strictly scientific character. A public meeting was held each evening; at the first Mr. A. H. Kirkland, of Boston who is in charge of the work, gave a most interesting description of the operations that are being carried on by the State of Massachusetts for the suppression of the Gypsy and Brown-tail moths. On the second evening an illustrated lantern lecture was given by Dr. E. M. Walker of the University of Toronto on the Dragon Flies of Ontario which were collected and studied at the Georgian Bay Biological Station. These meetings, which bring to the College men who are eminent in their respective departments of Entomological Science, cannot fail to be of the utmost value in arousing the enthusiasm of the College students, and affording them instruction and information that must prove an inspiration and a guide in their own incipient work.

I may repeat in conclusion what I said last year regarding the ability and industry of my colleague, Mr. Tennyson D. Jarvis. His devotion to the work of the department in all its details, his ready assistance and cordial co-operation, have been of the greatest possible help to me, and have assuredly been of immense value to the students in the various years who have been under instruction in Zoology and Entomology.

Respectfully submitted,

CHARLES J. S. BETHUNE.

PART VII.

THE PROFESSOR OF CHEMISTRY.

To the President of the Ontario Agricultural College:

Sir,—I have the honor to submit herewith the annual report of the Department of Chemistry for the year 1907.

Teaching.

The chemistry taught covers a very large field, including, as it does, Organic and Inorganic Chemistry, and Applied Chemistry in relation to soils, fertilizers, crops, cattle feed, dairying, insecticides and fungicides, etc.; in fact, all work in connection with farm life. We also give a course of three periods a week, from the middle of September to the middle of June, on the Chemistry of Foods to the senior classes in Domestic Science. This, together with the instruction given to students in the various short courses, forms an important part of the work of the department, and consumes a very large proportion of our time. As there has been no change in the subjects taught, and as the courses have been somewhat fully outlined in previous reports and in College curriculum, it will not be necessary to give any synopsis of the subjects taught at this time.

For the past few years we have been very much in need of more laboratory space to carry on our class work. I am glad to report that the addition to the Chemical building, so generously provided by yourself and the Minister of Agriculture, is now nearly completed, and that we shall have full use of it during the winter term. Perhaps it will not be out of place to give a brief description of the new laboratories:

The main addition is 75 feet long and 33 feet wide, two stories and a basement. One room in the basement, 30 ft. by 20 ft., has been fitted up especially for determination of nitrogen in the various classes of materials that we have to examine. The balance of the basement space, 30 ft. by 51 ft. is to be provided with tables on which geological specimens may be placed, in order that the students may see and handle the various rocks mentioned in the lecture work. On the main floor there are two laboratories and a wide students' entrance hall. The larger of the two laboratories, 30 ft. by 51 ft., is fitted with all the modern conveniences for quantitative analyses and provides ample table space for forty-eight students to work at once. The other laboratory is specially arranged for teaching of chemistry in relation to dairying. This room will be used by the senior students specializing in dairying and by the men taking the regular short courses in dairying the beginning of each year. In previous years this work has been carried on in a room in the basement not at all suited for the purpose. On the second floor there is a small class room with seating capacity for forty-eight; a laboratory for the use of the men taking the Chemistry and Physics Option; a room for the stenographer; and a milling and flour testing laboratory. These different rooms are all well furnished and complete in every way. I am confident that the increased facilities will not only make the teaching easier, but it will be possible to make it more thorough and more profitable to the students.

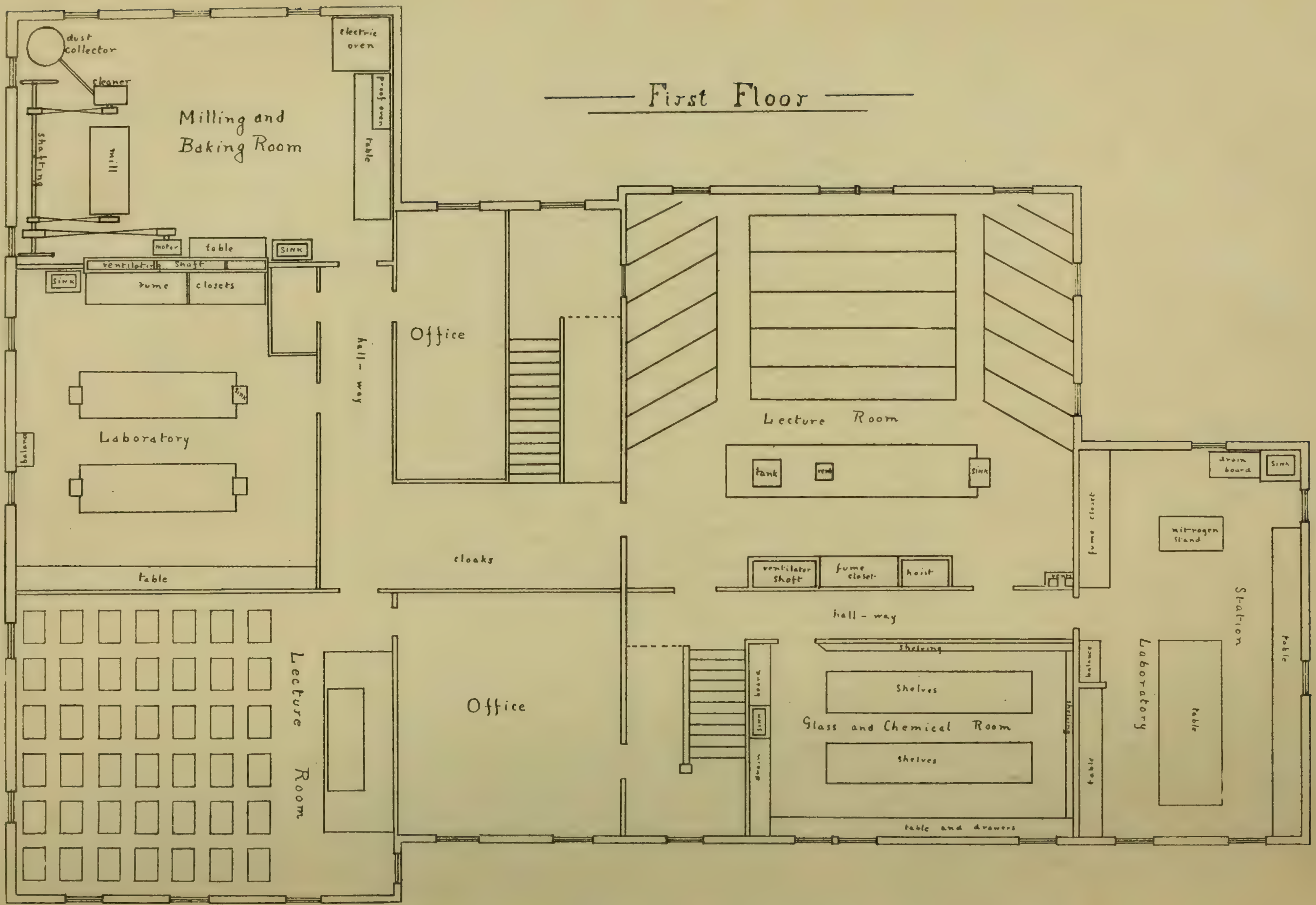
The division of the work of teaching has been about the same as in the past. Mr. Gamble, Lecturer in Chemistry, has taught the Inorganic and Animal Chemistry, the Dairy Chemistry to the fourth year men specializing in Dairying, and the Geology. With the help of Mr. Fulmer, I have taught the Organic and Agricultural Chemistry, Chemistry of Insecticides and Fungicides, Chemistry of Foods in the Domestic Science course, and the Dairy Chemistry to the men taking the short course in Dairying. Mr. M. F. Coglon, B.S.A., who succeeded Mr. G. G. White, B.S.A., as Fellow in Chemistry, has rendered efficient service in assisting in every way with the preparing of materials for class and in general analytical work.

The Chemical Building, showing the new addition.

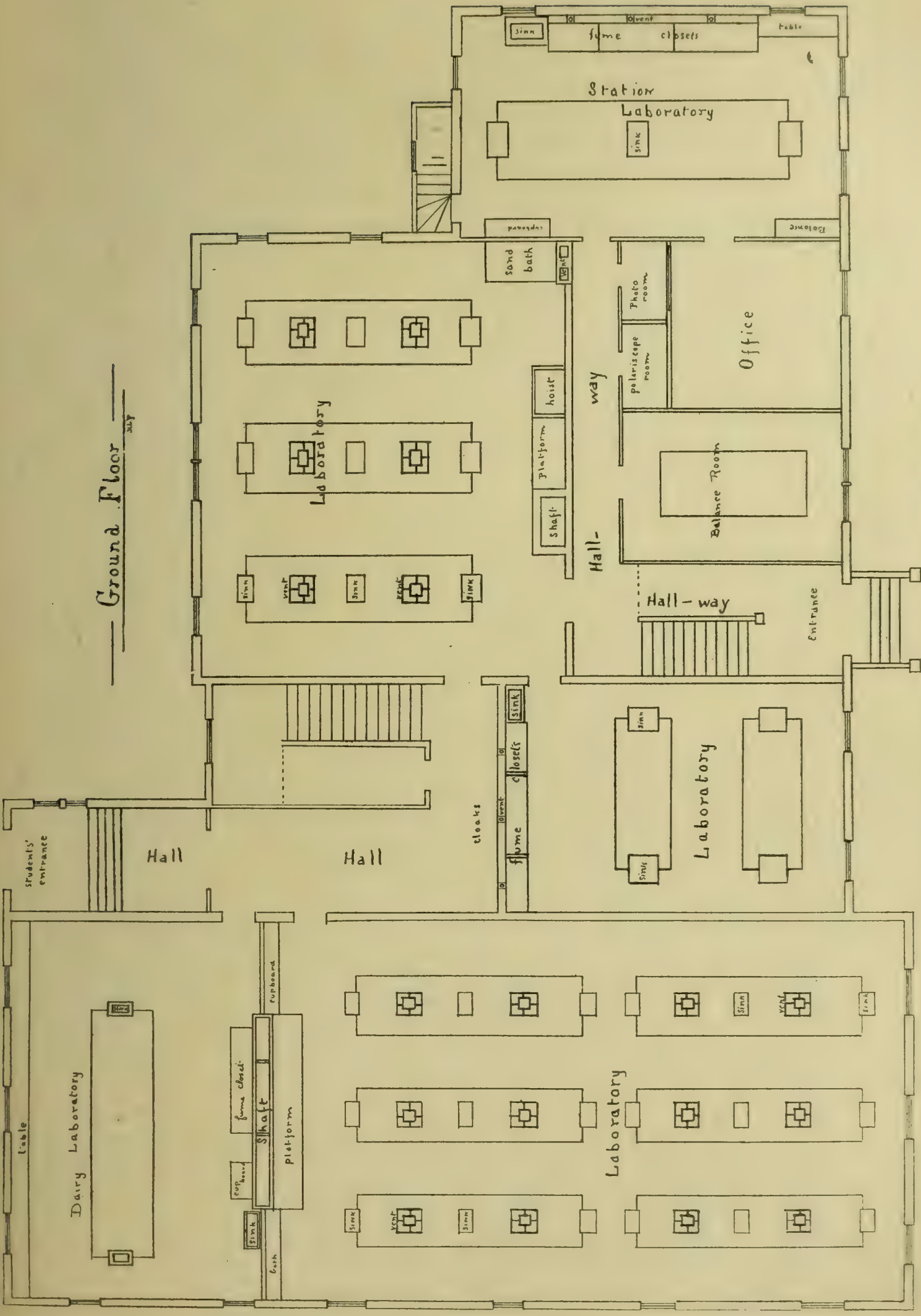
In June, Miss Jean MacPhee, a graduate of our Department of Home Economics, was appointed to take charge of the work in the milling and flour testing work of this department. She has since resigned, and Miss M. A. Purdy, also a graduate of the Macdonald Institute, has been appointed as her successor. This change in a line of work which requires expert manipulation has prevented the carrying out of some investigation work which I had hoped would be undertaken before this.

Miscellaneous Work.

A very large part of my time is devoted to general correspondence, preparing bulletins, writing articles for the agricultural papers, and addressing various farmers' meetings and the conventions of Dairymen, Fruit Growers, Bakers, Millers, etc. This part of my work is continually increasing, and year by year consumes a large proportion of my time.



Chemical Building, at Ontario Agricultural College, Guelph.



Chemical Building, at Ontario Agricultural College, Guelph.

During the past year the following bulletins have been prepared:

Insecticides and Fungicides.

Fertilizers and Their Uses.

Breakfast Foods: Their Composition and Digestibility.

Chemistry in Relation to Incubation of Eggs.

I also prepared a report on the Investigation into the quality of the Potatoes grown in the Maritime Provinces as compared with those grown in Ontario.

We have again this year co-operated with the Association of Official Agricultural Chemists in the study of methods of analysis of agricultural products. This year the work selected was on the determination of Moisture and Nitrogen in cornmeal and oil cake.

A large number of miscellaneous samples of a great variety of substances have been examined during the year. I am desirous of making this part of the work of the department as useful as possible and, therefore, invite farmers and others interested in soils, manures, foods, dairy products, etc., to correspond with us. We cannot always make the analysis requested, partly because of the amount of work entailed and partly because the samples sent have not been selected in such a way as to accurately represent the material of which it is a part; but we shall in all cases give the fullest information we can.

Very many of the samples sent in and analysed were of such a nature that, while the results were of value to the individual sending the sample, they would not be of sufficient general interest to warrant a detailed report here.

WATER ANALYSIS.

While we have somewhat discouraged farmers from sending in samples of water for analysis, we have this year received more samples than usual. Of the total number received, fully one-third proved to be unfit for domestic purposes. On many farms the wells are, for convenience sake, near the buildings. For a long time the soil will act as a filter and purify the water, but it will in time become clogged and contaminated; consequently, it is quite probable that many of the old wells are furnishing water unfit for use for domestic purposes. Such being the case,, it is, probably, our duty to assist farmers in ascertaining this fact. We shall, therefore, in future, analyse samples of water free of charge, provided they are taken according to directions.

FERTILIZERS FOR SUGAR BEETS.

It is impossible to grow sugar beets successfully on poorly prepared land, and without giving the crop the most thorough cultivation the whole season. With crops of this nature, it is particularly necessary for the farmer to secure maximum results, for the cost of seeding, thinning and cultivating will be about the same whether the crop is a good one or not. It is on crops of this kind that fertilizers ought to give the most economical results.

With the object of ascertaining the effect of fertilizers on this crop, we placed seven experiments with farmers growing beets for the Ontario Sugar Co., Berlin. In each experiment there were two one-acre plots. No. 1 received no fertilizer, while No. 2 received 300 pounds of superphosphate, 100 pounds of sulphate of potash, and 75 pounds of nitrate of soda. By an arrangement with the experimenters and with the factory authorities, the beets from each plot were delivered at the factory separately, and an accurate account kept of the weight of beets delivered, the per cent of tare, and the per cent of sugar in the tared beets. The results thus obtained were strictly under factory conditions. The following are the yields per acre of tared beets, the per cent of sugar, and the cash value of the crop on each plot:

RESULTS OF EXPERIMENTS WITH SUGAR BEETS.

Expt. No.	Plot.	Yield per acre, tared weight lbs.	Sugar. p.c.	Value.
1	No. 1	15,576	13.8	$35.78
	“ 2	20,312	14.0	47.32
2	“ 1	23,738	14.5	57.24
	“ 2	26,714	15.0	66.78
3	“ 1	30,251	15.3	77.14
	“ 2	31,777	14.8	78.23
4	“ 1	22,370	15.5	57.77
	“ 2	24,746	14.8	60.92
*5	“ 1	25,838	15.4	66.72
	“ 2	29,403	15.0	73.50
6	“ 1	20,862	13.8	47.88
	“ 2	21,500	14.4	51.49
†7	“ 1	33,339	16.0	88.90
	“ 2	36,158	16.3	98.23
	“ 3	32,183	15.9	85.28

*No nitrate of soda used.

†This experiment was arranged as follows:

Plot No. 1 received:— 75 lbs. nitrate of soda.
200 “ superphosphate (20% available).
“ 2 “ 75 “ nitrate of soda.
200 “ superphosphate.
200 “ muriate of potash.
“ 3 “ no fertilizer.

As the fertilizers used on Plot No. 2 cost nearly eight dollars, it will be seen that there was not sufficient increased returns in all cases to pay for the fertilizers used; but it must be remembered that the materials supplied would probably influence the yield of the succeeding crop, and, furthermore, all the experimenters reported quicker germination, enabling them to thin about three days sooner. This would be of great importance in an unfavorable season.

TOMATO REFUSE.

The proper disposal of the refuse from the rapidly increasing canning factories is becoming a live question. At the present time it is disposed of in various ways, some of which are satisfactory and others unsatisfactory. Perhaps the refuse which causes the most trouble is that from the tomato. In some cases it is flushed into the adjoining river or bay, in others it is allowed to accumulate near the factory until it becomes a nuisance, while in other cases it is drawn away and spread over the land. The difficulty with this latter method is that the refuse is thought to be of so little value that it is hard to get the farmers in the busy season to take it.

To ascertain the manurial value we analysed a sample of tomato pulp, which is composed principally of skin, and found that the dried matter contains the following percentage amount of fertilizer constituents:

Nitrogen (N)	2.54
Phosphoric acid (P_2O_5)	3.28
Potash K_2O	.64

We had no opportunity to ascertain the per cent. of water in the material as it would leave the factory, but assuming that it would contain 75 per cent. of moisture, the percentage amounts of the different constituents would then be as follows: Nitrogen, .64; Phosphoric acid, .82, and potash, .16. Farmyard manure containing 65 to 80 per cent. of water will have .45 to .65 per cent. of nitrogen, .2 to .4 per cent. of phosphoric acid, and .4 to .8 per cent. of potash. It will be noticed that the tomato pulp compares very favorably with farmyard manure in the amount of these constituents. It is, of course, well known that farmyard manure is valuable for other things, and we would not wish to be understood as giving tomato pulp an equal value. Tomato pulp may be applied on almost any soil, but if used in very large quantities, it may possibly have an injurious effect upon clay soils, although even large quantities would not be detrimental on sandy soils.

RAPID METHODS FOR DETERMINING MOISTURE IN BUTTER.

The last few years there has been considerable agitation among dairymen for some quick method for the determination of moisture in butter. As a result two or three rapid methods have been devised. We have thoroughly tested these methods in comparison with the old method of drying in the water oven. At my request, Mr. H. L. Fulmer has prepared the following description of the method and the results obtained from them:

As several methods for the rapid determination of moisture in butter have recently been brought to notice, methods specially devised for the use of practical butter makers and for those interested in the handling of butter, it was thought that it would be of value to those concerned in the butter industry were we to spend some time in examining these methods, in order to find out whether or not they would be applicable to the purpose for which they are intended. This we decided to do, and we wish here to publish the result of our work.

The main essential of any method for the determination of moisture is, of course, accuracy; but combined with such a feature it is desirable that the method shall also admit of easy manipulation, be practicable, *i.e.*, call for no particular skill in manipulation, that it require apparatus which shall be durable, that it be reasonably inexpensive, and, what is most important, perhaps, that it really be a rapid method.

The most promising methods which we have so far examined are "The Beaker Method," as given by H. D. Richmond,* and since improved by Patrick;¶ and "Gray's Method,"§ with both the original and the improved apparatus; and it is these methods which we shall discuss.

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*"Dairy Chemistry," 1899, p. 252; and Laboratory Book of Dairy Analysis.

¶Journal American Chemical Society, July, 1907, Vol. XXIX, p. 1126. The method is more fully described in the same journal, Vol. XXVIII, No. 2, p. 1611, *et seq.*

§This method was worked out by Mr. C. E. Gray, Assistant Dairyman, Bureau of Animal Industry, U.S. Department of Agriculture. His original apparatus is described and directions for its use given in Circular 100 of the Bureau while the Wagner Glass Work of New York City, in their illustrated price list, describe both the original and improved apparatus, give prices, and print in full directions for using.

To gain some idea as to accuracy we determined moisture in a number of butters and checked the results by means of figures obtained from the same sample, using the official standard method outlined in "Methods of Analysis" adopted by the Association of Official Agricultural Chemists. The following table gives in detail the results of these determinations. In most cases the table also shows duplicate figures and from a study of these some idea can be gained as to the constancy of results which it is possible to obtain by use of the different methods.

COMPARISON OF METHODS OF DETERMINING MOISTURE IN BUTTER.

Sample.	Official Method.	Beaker Method.	Gray's Method Original.	Gray's Method Improved.
1	13.3	13.1	....	....
2	14.0	14.2	....	....
3	17.0	17.5	....	....
4	13.4	13.3	....	....
5	15.5	15.9	....	....
6	13.6	13.8	....	....
7	14.1	14.4	....	....
8	14.6	14.5	....	....
9	13.1	13.4	....	....
10	13.0	13.1	12.5	....
	....	13.2	12.6	....
11	13.4	13.7	13.0	....
	....	13.8	12.6	....
12	13.1	13.5	12.4	13.2
	....	13.3	12.8	13.4
13	14.8	14.7	14.6	15.0
	....	14.7	14.3	15.0
14	14.3	14.3	13.7	14.2
	....	14.2	13.6	14.2
15	13.5	13.4	13.0	13.8
	....	13.8	12.9	13.6
16	14.4	14.4	13.8	14.4
	....	14.6	13.9	14.4
17	11.3	11.6	10.6	11.2
	11.4	11.5	10.5	11.1
18	11.3	11.6	10.4	11.0
	11.3	11.6	10.4	11.0
19	11.5	11.5	10.6	11.1
	11.5	11.6	10.6	11.1
20	11.2	11.3	10.3	10.9
	11.2	11.5	10.2	10.9

There is no question as to the accuracy of the official method. Results obtained by its use are absolutely correct, except in so far as they are modified by inevitable experimental errors, in sampling, weighing, etc. Therefore, any method which gives results which correspond with those obtained by the official method must be considered accurate. Looking over the above table, it will be seen that the results from both the Beaker method and Gray's Improved method compare very favorably with those from the Official method. The Beaker method tends to give results which are a little too high, but the greatest error shown only amounts to 0.5 per cent. and most of the results correspond almost exactly with, or differ only so slightly from, those of the standard that the difference might easily be due to experimental error. On the other hand, Gray's improved method inclines to give results slightly too low, but, here again, the greatest error is only 0.4 per cent., and the same remarks concerning the Beaker method will apply here also. These two methods are certainly remarkably accurate, and can without any hesitation be highly recommended for commercial and factory work. The original Gray method gives results which are much too low (as much as 1.0 per cent. in sample 20) to be reliable. It is thought that the low results obtained by this apparatus are due to the fact that the graduated neck presents too small a condensing surface and that it is for this reason only that it falls behind the Improved method in accuracy. This must be true, because both these forms depend upon exactly the same principle for the recovery of the moisture. For the writer's part, he greatly prefers the older form, because of the much clearer reading which it gives and because of the accompanying apparatus not being quite so cumbersome. But for the reason just given above and for the additional reason that it requires a glass stopper which is easily lost or broken and which cannot be handily replaced if such a thing occur, the original method must give place to the later one.

In ease of manipulation the Beaker method has the advantage because of the much simpler apparatus which it requires. It is also much less expensive, both as regards first cost and as to maintenance and durability. A simple aluminum beaker, which is practically indestructible under the conditions of the test, and a pair of iron tongs are all that is required, aside from the sensitive balance and the alcohol lamp, both of which latter are indispensable in all cases; whereas the Gray method requires several pieces of glassware which are easily broken even with the best of care, and requires as well chemical reagents, which become exhausted and must be replenished from time to time. As far as regards economy of time in making estimations, neither method has any advantage, both requiring from 15 to 20 minutes only, for carrying through a determination, including weighing out sample, heating and cleaning. The Gray method has an advantage over the Beaker method, however, in that it requires no record of weights to be kept (except in special cases). The method calls for a definite weight of butter, just as does the Babcock test for estimating the fat in milk, and the per cent. of moisture is read off directly from a graduated neck, just as with the Babcock test bottle. Thus no record of weights nor consequent calculations are required. Further than this, Gray's method calls for the expenditure of less time in cleaning. It is possible to make a great number of determinations without doing more cleaning than emptying the liquid fat from the flask after each time, whereas with the Beaker method thorough cleaning and drying must be accomplished after each individual test.

In conclusion, we wish to state that the two methods, the Beaker and Gray's improved, supply rapid means for determining moisture in butter. They are both sufficiently perfected to enable anyone with an average degree of intelligence and skill to obtain results by them which shall be approximately true. We are inclined to recommend the Beaker method because of its greater simplicity, durability, and economy. Neither one will admit of application in exact inquiries, but for the study of factory problems in relation to moisture and for the control of the local and export market product either one cannot fail but prove to be of inestimable value.

Our Milling and Flour Testing Department.

Some time ago a joint committe of the Dominion Millers' Association and the Master Bakers' Association waited on the Minister of Agriculture and obtained from him the promise to establish an up-to-date wheat and flour testing plant at the College. This plant is now in operation, and it has been thought well to prepare a brief outline of the need of such a plant, the nature of the work which we hope to do, and a description of the various appliances used in the work.

Few people realize the wide differences that exist in the quality of the numerous kinds of flour on the market. The average housekeeper may buy a pastry or a bread flour, but does not know the variations in strength of the flour used for the latter purpose, nor of the difficulties the miller has to contend with in producing a grade of flour that is uniform in strength from month to month.

The quality of a flour for bread-baking purposes is dependent upon even granulation of the particles of the flour, color, and the quantity and quality of the gluten. The production of flour of even granulation is entirely a milling problem; the color of a flour is influenced by the nature of the wheat used and by the milling process, but it is practically under the control of the miller; while what is known as *strength* in flour is almost entirely dependent upon the inherent qualities of the wheat, or, in other words, on the amount and quality of the gluten. It is true good wheat may be spoiled in the milling, but this is seldom or never the case where the miller knows his business. As the gluten content of wheat varies very widely in different varieties and in wheat grown in different localities and in different seasons, it is probable that the wheat delivered at the mill, whether by wagon or by railroad cars, differs very widely in the qualities required for the production of a strong flour. Millers soon become familiar in a general way with the quality of flour that may be made from certain varieties of wheat, or from the wheat grown in different localities, and generally mix or blend the stronger with the weaker wheats and in this way produce a grade of flour of fairly uniform quality throughout the year. But without accurately conducted tests, experienced as the miller may be in judging flour by feel and by doughing tests, he cannot be absolutely sure of the result.

Owing to differences in climatic conditions and possibly to other influences, wheat grown in one season may produce flour of a very different quality from that of another. One year the flour may be characterized by low yield of bread, another by poor expansion in the loaf, slow fermentation, etc., all of which are due to inherent qualities of the wheat and entirely beyond the control of the miller. From all accounts the wheat grown in the western provinces this past season is of a very varied quality, and it is natural to expect that the flour will also be widely different in quality. The mixing of the wheat in the elevators will, to a certain extent, overcome this natural variation, but it is quite probable that the flour on the market this year will not be as uniform in quality as might be desired, unless extra pains are taken to ascertain the strength of the wheat being ground.

Because of these variations in the strength of flour, the problems of the baker are increased. If flour was always of the same nature and strength the making of bread would be a comparatively simple matter; but, where the flour differs so widely in quality as it is very apt to do, especially at the time of the change from the old to the new wheat, the problem is not a simple one. This is at least partly due to the fact that comparatively little is known about the make-up of the different parts of a flour. We do know that flour contains carbohydrates, fat, ash materials, and gluten, and that we are probably correct in stating that the strength of a flour is in some way dependent upon the quantity and quality of the latter substance, but there are still many points in connection with the gluten and carbohydrate content of a flour that we do not understand. Two fresh, sound flours may be equal in color and in quantity of gluten and yet act altogether differently when baked. Some of the causes of this difference may be explained as a result of a chemical examination, but the fact remains that there are many peculiarities about the way a flour "works" that cannot be fully explained by the scientific knowledge possessed to-day. It may seem strange that a material that is so generally used and in such enormous quantities has not been more fully studied, but frequently the most common things around us are, after all, the least understood.

Recognizing the assistance a thoroughly up-to-date flour testing plant would be to the miller and the baker in the practical part of their work, and the need of more scientific investigation into the question of "quality" in flour and the problems of bread-making, the Executives of the Canadian Master Bakers' Association and the Dominion Millers' Association waited on the Provincial Minister of Agriculture and asked that such a plant be installed somewhere in the Province. The Minister at once granted their request, and directed that the necessary appliances be purchased and installed in the Chemical Laboratory of the Ontario Agricultural College. This has been done, and the plant has now been in operation for a few months. The plant is essentially the same as that used by some of the larger milling companies on this continent, and consists of a scourer and dust collector, a mill for grinding the wheat, an electric proof and bake ovens, appliances for testing gluten, measuring the volume of the loaf of bread, and all necessary utensils for the proper carrying out of the work.

The scourer is about two feet wide and two feet high, but, small as it is, it has a two-screen shoe for the separation of foreign matter, a fan twelve inches in diameter, and a scouring cylinder eight inches long, and is connected with a small dust collector. By means of this machine we can clean the grain as thoroughly as it is done in the large mills.

The flour mill consists of two pairs of six-inch rolls, a corrugated pair and a smooth pair. These are connected with feed rolls, and by means of a side lever may be brought together or apart as the operator may desire. On the centre of the machine there is an arrangement for sifting or bolting the flour. This may be started or stopped while the machine is running without affecting the rest of the mill. The sifter carries three screens which may be replaced by others of smaller or larger mesh to suit the nature of the wheat being ground or the product desired. They are so arranged that the coarse bran layers are retained on the top sieve and the flour sifted out of the bottom one. There is no purifier attached to the mill, consequently we cannot separate fine light particles of flour or specks of bran as completely as might be desired; but by careful attention to details, we have been able to prepare a good granular flour of excellent color. No attempt is made to separate the flour into the different grades commonly prepared in the larger mills.

The electric proof oven is four feet by four feet by one foot in size, and contains three shelves. It is lined with asbestos and wired in two circuits, so that when both switches are thrown in the oven may be warmed up quickly, and when one switch is withdrawn the temperature may, with very little difficulty, be held at any desired point.

The electric bake oven is three feet square, inside measurement. The walls are lined on the inside with Russian iron and between this and the outer oak walls there is four inches of asbestos, thus insuring almost complete insulation. The wiring of the oven has been done in such a manner as to spread the heat from the electric current evenly throughout the oven and is of sufficient quantity to cause the temperature to be quickly raised to the required point.

To measure the expansion, or size, of the loaf, it is placed in a box of known capacity and all the vacant space filled with small seed. At the bottom of the box there is a slide which may be drawn and let the seed fall down into a box with a long neck arranged in such a way that an accurate measurement of the seed may be made. The difference between the cubic contents of the first box and the amount of seed required to fill the space not occupied by the loaf must of necessity give the volume of the loaf.

In our comparative bread-making tests, nothing but water, salt, sugar, and yeast are mixed with the flour. Twelve ounces of the flour to be tested is mixed in a bowl with sufficient water containing the other ingredents to form a slack dough. This is placed in the proof oven at a temperature of 60° F. until sufficiently risen to indicate that it is ready for kneading. The kneading is done in the hands, thus overcoming the loss of material that might be incurred by working on the table. After a second kneading, the dough is allowed to stand until ready for the pans. It is then placed in the pans and baked for one hour at a temperature of 360° F. The bread is then allowed to cool, after which it is weighed, the volume of the loaf determined, and then cut and judged for quality. In these comparative tests, the yeast is used in what might be considered excessive quantities. The object is to cause the dough to rise as high as possible and thus bring out the strength of the flour. The expansion, or the size of the loaf, is afterwards determined, and this, together with the texture of the bread, forms the basis for the judgment of the strength of the flour. The pans are made narrow so as to cause the loaf to take a high form in order to afford a better opportunity of judging the power of the dough to expand. The use of electric proof and bake ovens renders it possible to have almost complete control of the temperature and, consequently, to carry out these comparative baking tests under uniform conditions. The flour tests also include a determination of the per cent. of wet gluten and the amount of water the flour will absorb.

When this work is done by an experienced person, the slightest difference in the quality of flours may be determined. In every case a standard flour of the same grade or blend as the flour to be tested is baked and the results are reported in per cent. of the standard. The following is a sample of the reports sent out:

	Standard Patent	Sample tested No. 1	Sample tested No. 2	Standard Bakers	Sample tested	Standard Blend	Sample tested
Gluten	32.33	32.40	32.00	34.00	35.00	28.76	27.00
Absorption	62.00	64.00	62.00	65.00	62.00	55.00	55.00
Yield of Bread	100.0	100.0	100.4	100.0	98.0	100.0	100.0
Volume of Loaf	100.0	92.0	100.0	100.0	98.0	100.0	95.5
Color	100.0	100.0	100.0	100.0	99.0	100.0	100.0
Texture	100.0	99.5	100.0	100.0	100.0	100.0	100.0
Quality of Loaf	100.0	99.5	100.0	100.0	99.0	100.0	100.0
Average Values	100.0	99.5	100.1	100.0	99.1	100.0	99.1

It was not the wish of the committees that asked for the installation of this flour testing plant, nor the intention of the Minister of Agriculture when he granted their request, that the work should be done free of charge. After consulting several members of the Executives of the two Associations, we have decided to place the fee at two dollars per sample for grinding the wheat and testing the flour, and one dollar for testing the flour alone. Although only twelve ounces of flour are used in the baking test, we ask for three pounds of flour and five pounds of wheat. This is done in order that there may be sufficient to duplicate the work, if such be deemed advisable.

We are now in a position to aid the miller by determining for him the strength, or the quality, of the wheat he expects to mill. If he intends grinding a mixture of western spring wheat with a softer Ontario winter wheat, we can assist him in finding out what will be the best proportions to mix these grains to give him the desired results. We can also be of service to him in testing his output of flour from time to time to see that it is uniform in quality. In these and many other ways, we can directly aid the miller in his work. Further, there are many problems in connection with the milling business that we may help him to solve. For instance, it is contended by many that hard and soft wheat should not be mixed before grinding, but rather that they should be ground separately and then the flours blended. This is a point which we expect to take up at once. Another point we expect to investigate is the milling quality of the different varieties of wheat grown in Ontario. We have tested the flour ground in our own mill from the different varieties grown on the experimental plots at the Ontario Agricultural College during the season of 1905 and 1906, and some very interesting results have been obtained. The problems of blending the soft Ontario winter wheat with the hard spring wheat of the West will also be studied.

To the baker we can be of assistance in testing flour that may not be "working" satisfactorily, and make plain whether the fault lies in the flour or in his process of manipulation. We may also be able to furnish him with some information regarding how a particular flour should be handled, or in providing him with definite information upon which to base a complaint to the miller. We also hope to help him solve some of the deeper problems of the bread-making processes by gaining a fuller knowledge of the chemical differences in flour, and their direct effect on the making of bread.

To both the miller and the baker we promise to give all work sent to us careful and prompt attention, and we trust that the use made of this flour testing plant will prove that the Executives of the two Associations were warranted in asking for the installation of the plant, and that the Minister of Agriculture will not regret having granted their request.

INVESTIGATION WORK.

The three lines of investigation work to which we have devoted the most attention this year are, the composition and cooking qualities of potatoes, chemistry in relation to incubation of eggs, and composition and digestibility of breakfast foods. As a report of the work done on these investigations has been made to you, it will not be necessary for me to give any detailed results here. I have, however, made a brief statement of the work done and the results obtained.

POTATO WORK.

Last spring, Mr. C. C. James, Deputy Minister of Agriculture, instituted an inquiry into the reasons why such large quantities of potatoes grown in the Maritime Provinces are annually brought into Ontario. In connection with this investigation, I was instructed to collect and analyze samples of potatoes grown in Nova Scotia and New Brunswick and in this Province, in order that we might ascertain if there was any difference in the composition of the potatoes that would throw any light on the subject. We analysed and determined the cooking quality of eighty-one samples of potatoes, fifty-three of which were grown in Ontario and twenty-eight in the Maritime Provinces. A full report of the work has been published in the Farmers' Institute Report for 1906. It may be of interest at this time to quote the following paragraph from the conclusions drawn from the table giving the cooking quality and the chemical composition of the potatoes examined.

A study of the data presented in the two tables seems to indicate that mealiness in the potato is not associated with high proteid; in fact, it would appear as though low proteid and high starch content are the desired factors in quality, especially in mealiness, of the potato. With reference to these points, it is worthy of notice that the average proteid content of the Ontario potatoes analysed is 2 per cent. higher, and the starch 4 per cent. lower than in those received from the Maritime Provinces. Also that the average total figures given for quality are 7.1 lower for the former than for the latter. The greater part of this difference is made up in the column showing the mealiness of the potato. If we compare the marks given for mealiness of potatoes containing 10 per cent. or lower of proteids, we find that, with very few exceptions, they stand over 30, with several above 37, whereas comparatively few of those containing higher quantities of proteids received as many as 30 marks.

CHEMISTRY IN CONNECTION WITH INCUBATION OF EGGS.

In co-operation with three other departments of the College, we have devoted considerable time to some of the problems in connection with the incubation of eggs. The particular phase of the question studied the past summer was with reference to the lime content of the shell, white, and yolk of the egg and of the young chick. The investigation has not been completed, excepted in so far as we have established the fact that the amount of lime in the young chick is from five to six times that contained in the white and yolk of the eggs and, consequently, that the lime of the shell must be absorbed during the process of incubation. The results also indicate that the larger the quantity of lime in the chick, the greater the vitality. A report of progress of the work done has been made and will appear, along with the reports of the other departments interested in bulletin form, at an early date.

BREAKFAST FOODS.

During the last two years we have devoted a large amount of time to the study of breakfast foods. In this investigation, we analysed nearly one hundred samples of foods, and carried out forty-six successfully completed digestion experiments. We also determined the efficiency of the "malting" or "predigestion" process and the thoroughness of the cooking to which the ready-to-serve foods have been submitted, as indicated by the solubility of the foods, and obtained some figures with reference to the influence of long and short periods of cooking on the composition and digestibility of oat and wheat meals.

Although there is such a large number of breakfast foods on the market they are practically all made from five kinds of cereal grains. The great majority of those used in this country are made from two—oats and wheat—and nearly all the ready-to-serve type are prepared from one, wheat. The chemical composition of the various foods shows that the method of preparation has not materially altered the proportion of the different nutrients of which they are composed, and that they correspond closely with the grain from which they were made. The exceptions to this are that in the oat product the amount of crude fibre has been reduced by removing the hull, and that in preparing the finer grades of cornmeal, the bolting process removes a portion of the fat. Whole wheat has about the same amount of crude fibre as the prepared oatmeals, and the farinas have a part of this removed. Many persons consider that since the bran layers of the wheat contain so much protein and ash material, they should be retained, even if the presence of the associated crude fibre does decrease the digestibility of the food. There would probably be some reason for this contention, especially when fed to young people, if these farinas formed the whole of the diet, but the ordinary mixed diet probably furnishes all the mineral matter which a healthy person requires. Moreover, the presence of crude fibre may injuriously increase peristaltic action, although, on the other hand, it may be useful in cases of constipation. The breakfast foods prepared from oats are rich in protein and fat, and those of corn are rich in carbohydrates and poor in protein fat. Rice is poor in protein and ash and rich in carbohydrates, containing very little crude fibre, while barley contains a fair proportion of all the nutrients without an undue proportion of crude fibre.

The proportion of the various constituents of the different forms of breakfast foods digested does not differ very widely. Even the so-called "predigested" foods are not more completely digested than the others. What difference there is would go to show that they are not so fully absorbed as the oat and wheat meals when properly cooked.

Thorough cooking is an important factor with starchy foods, and, consequently, with all the breakfast foods. It not only makes the food more palatable, but it also breaks down the walls of indigestible fibre which surround the starch granules and the other nutrients, and in general produces changes which render the food more susceptible to the action of the digestive juices, thus probably increasing the ease and rapidity of digestion, and, to some small extent, the completeness of digestion. From the results obtained in our work, it would appear that the farinas do not require so long cooking as the rolled oats or cornmeal. Further, judging by the solubility of the organic matter, some of the much advertized prepared foods are not so well cooked as might be desired; for while twenty minutes cooking is not considered sufficient to properly prepare oatmeal porridge, it was found at the end of that time to contain more soluble matter than some of the prepared cooked foods; and nearly as much as some of the cooked and malted preparations. Farinas cooked for the same length of time were, with one exception, about as soluble as all of the so-called "predigested" foods examined. The percentage amount of soluble matter in a food may not form an absolutely correct basis for judging the efficiency of the cooking or malting process; but, as these processes tend to render certain parts of the food soluble, it certainly gives us a good basis of comparison. If this be true, we are right in concluding that some of the prepared foods should be further cooked before serving.

As regards palatability, one food does not seem to have much advantage over another. The mere fact that all are bought and used is sufficient evidence that they are palatable. Certain foods may "agree" with some people better than others. That is, after all, a matter of individuality, and each person must choose for himself; but with the great majority of people who use breakfast foods regularly, it is doubtful if the newer "malted" or "predigested" foods are more tasty or palatable than the older fashioned oat and wheat porridge. The cost of the numerous kinds of breakfast foods varies widely. The price per package may not be very different, but there is a wide difference in the actual weight of material in the packages of the different brands of these foods; and this, together with the differences in composition and digestibility that exist, is sufficient to render the actual nourishment obtainable from some foods very much more expensive than others. This is very clearly brought out in the following table, which gives the number of grams of potein and carbohydrates contained in, and the fuel value of the digestible matter of, ten cents' worth of each of the foods.

NUMBER OF GRAMS OF DIGESTIBLE PROTEIN, CARBOHYDRATES, AND NUMBER OF CALORIES FROM 10 CENTS WORTH OF THE FOODS.

Food	How sold	Price	Grams of digestible Proteids	Grams of digestible Carbo-hydrates	Cal-ories
Granulated Oatmeal	In bulk	7 lbs. for 25c.	118.3	885.1	4,922
Rolled Oats	" "	7 " " 25c.	127.1	874.1	4,915
" "	" package	2 " " 10c.	90.9	624.1	3,510
Farinas	" bulk	6 " " 25c.	75.9	806.3	3,860
"	" package	2 " " 15c.	41.8	448.0	2,146
Wheat Germ	" bulk	7 " " 25c.	118.9	950.5	4,861
Rolled Wheat	" "	6 " " 25c.	73.9	793.4	3,784
" "	" package	2 " 13 ozs. for 15c.	57.8	619.8	2,964
Flaked Barley	" bulk	2 " for 10c.	59.6	683.1	3,035
Cornmeal	" "	8 " " 25c.	70.1	1,175.1	5,316
"	" package	3 " " 10c.	62.6	1,049.2	4,746
Orange Meat	" "	20 ozs. " 15c.	26.9	279.3	1,341
Force	" "	16 " " 15c.	18.0	219.0	1,010
Norka	" "	22 " " 15c.	48.5	282.7	1,578
White Bread	" loaf	2½ lbs. " 10c.	90.4	546.8	2,817
Entire Wheat Bread	" "	2½ " " 10c.	71.5	473.3	2,418
Graham Bread	" "	2½ " " 10c.	73.7	443.7	2,322

It is evident that in many cases the market price has little connection with the nutritive value, or even with the cost of the materials and preparation. The uncooked oat, wheat, and corn meals, especially those bought in bulk, are the cheapest per pound, both in weight of nutrients purchased and in the amount absorbed by the system. It is possible that the cost of cooking may be sufficient to materially offset this advantage; and that the convenience of the ready-to-serve food may compensate for the higher cost. These considerations must, of course, vary with circumstances, and each person must decide them for himself.

In general, it may be stated that the various forms of breakfast foods on the market are all wholesome and nutritious foods. At present prices the uncooked oat, wheat, and corn meals are among our most economical sources of nutrients and energy and, taking everything into consideration, it is probable that oatmeal ranks highest among these. It may not "agree" with everyone, but for those who can use it, there is no breakfast food which combines high protein content and energy producing qualities so well as oatmeal. The prepared breakfast foods are more expensive, and evidently not because they contain any more nourishment, but because of the way they are prepared, the manner they are put upon the market, and the expense incurred in advertizing. A curious name or appearance or a mysterious process of preparation, does not give them the extraordinary food value sometimes claimed. They may have a place in a hurry-up breakfast, but where economy is considered there is nothing in the composition, digestibility, or palatability of these high priced "predigested" foods to justify the extravagant price asked for some of them.

UNCOMPLETED WORK.

Testing Milling Qualities of Ontario Fall Wheat. With the object of obtaining some definite information regarding the best milling varieties of wheats grown in this Province, we have made regular baking tests with all the varieties that we could get of the wheat crop of 1905 and of 1906, and we intend testing all the varieties grown on the Experimental Plots in 1907. Along with these baking tests we shall make determinations of the amount of alcohol soluble proteids and shall do other work to see if we can ascertain whether there are any chemical differences in the proteids of these different varieties of wheat which vary so widely in breadmaking qualities.

Lodged Grain. In past reports we have referred to the fact that we are studying the causes of the lodging of grain. For many years large acreages of grains, oats particularly, have been partially destroyed by lodging. This past season was drier and the lodging was not so serious. We have in the Laboratory at present some materials collected from this last years' crops which we intend to examine as soon as we can get time for the work. We hope that we shall be able to get some definite information regarding the cause of the lodging and be able to suggest some method of treatment that will overcome the trouble.

Lime and Sulphur Wash. The lime-and-sulphur wash is now generally accepted as the most practicable and efficient remedy for San José Scale. Among fruit growers, however, there is a diversity of opinion regarding the details of preparation of this insecticide. Some prepare the wash by boiling a definite length of time; others are guided by the color produced as a result of boiling. We feel confident that the lime from different parts of the Province is not all equally suitable for the purpose, as, for instance, lime produced from dolomite rock, which contains magnesia, is not so suitable as lime from the pure calcuim carbonate rock. It is quite probable that the coloration that is got as a result of the boiling is due to some impurities, such as iron, and does not indicate completeness of combination of lime and sulphur. We are, therefore, making a study of the whole question, and shall determine the amount of sulphur and lime combined with various lengths of time of boiling, the efficiency of limes got from different parts of the Province, the causes of the greenish color, etc., etc.

In conclusion, I beg gratefully to acknowledge the co-operation of the various College departments in the carrying out of our years' work.

Respectfully submitted,

R. HARCOURT.

THE LECTURER IN CHEMISTRY AND GEOLOGY.

To the President of the Ontario Agricultural College:

SIR,—I beg to submit herewith a brief report of my work for the year 1907.

As a general outline and scope of my class work has been given in former reports, I shall not take up space with a recitation of facts already known. Permit me, however, to offer a brief word of explanation with reference to our methods of teaching Chemistry to students of Agriculture.

TEACHING.

In the higher institutions, such as our own, the first course is general and descriptive chemistry, of which every person who expects to engage in any scientific pursuit should have a thorough knowledge; and, as has been generally agreed upon, this subject should have a prominent place in college courses. Concerning details of the most efficient methods of teaching general chemistry, no doubt an extended course of experimental lectures, closely connected with laboratory practice, affords the best training. To carry out this idea, our laboratory work is so arranged that the lectures of each week shall include the experiments for the laboratory. We also endeavour to conduct weekly recitations on the subjects of the lectures and laboratory work, thus enabling us to control the progress of our class. When the students first enter the laboratory it is essential that they be impressed with the necessity for accuracy in the details of experimental work. This important lesson we endeavour to teach by means of experiments affording quantitative results. It is our firm belief that there should be sufficient instruction in the laboratory for careful oversight of the experimental work and the note book of each student. Moreover, we are convinced that it is unwise, in any grade of undergraduate study in chemistry, to allow students in laboratories without constant supervision. When left to themselves they are apt to loiter, to contract careless habits, and to waste material. I regret that we are not as yet in a position to insist upon adherence to such rule, because of want of assistance.

In addition to the above I desire to add that, while methodical habits are to be strenuously insisted upon, the methods may be sufficiently flexible to allow the student to reach his conclusions in his own peculiar way; the particular form of lecture and laboratory notes, for example, we leave to the preference of the student, provided they are well written and complete.

INVESTIGATION.

Our investigations during the year have dealt with the ash constituents of the sugar beet and beet-pulp, the composition of by-products, condimental and stock-feeds, and co-operative work in methods of analysis of agricultural products.

ASH CONSTITUENTS OF BEET-PULP.

Of recent years many experiments have been conducted in different sections of Ontario to ascertain whether the soil and climate are suitable for the profitable growing of beets for sugar production. Prof. Harcourt has already reported the results of the investigations along this line, and as an outcome of the favorable results of these investigations, a new industry has sprung up. The introduction of the beet sugar industry in sections of Ontario has disturbed the routine of farm practice, and has created a new avenue for the output of agricultural products; and by-products of this industry have furnished a new stock feed. It will, therefore, be helpful to the farmer to know what will be the probable influence of sugar beet growing on the fertility of the soil, and also to know what value beet pulp has, as a stock feed. With a clear undertsanding of these questions, the farmer will be enabled to avoid wasteful practices, and to adopt a course of economy. In last year's report we discussed the latter question, and it is the object of this article to bring together certain experimental data, and to interpret these with a view to answering the former.

It has been said that sugar beets do not exhaust the soil to any noticeable extent, because the crown of the beet which is left on the farm, contains the greater portions of the ash. This is what has been alleged. The results of experiments here in the laboratory go to show that the crown contains a somewhat higher percentage of ash than does the factory portion of the beet.

Six sugar beets, of medium size, and of various shapes, were selected from a pile of beets grown on the experimental plots at the Ontario Agricultural College. Great care was taken that the whole of the crown and root were attached, and that no incisions or rupture had been made wherein soil might lodge. These beets were scrubbed and washed scrupulously clean of earth, and any remnant of leaves were removed. The crowns were then separated from the factory portion, by cutting across the beet so as to include that portion containing all the leaf-scars with the crown portion. By grating each portion separately, drying and grinding the two samples were prepared for analysis. These two samples, in duplicate, were burned according to the method introduced by Dr. Shuttleworth some years ago. The duplicate results were quite uniform, and the average results showed that the per cent. of ash in the dry matter of the crown portion of the sugar beets was 6.92, while in the factory portion it was 5.68.

From these figures it is evident that there is but little difference between the ash content of the crown and the factory portion, and, therefore, it cannot be said that the larger portion of the ash remains in the crowns, since there is so much more of the factory portion than of the crown. It is true, however, that the leaves are very rich in ash, for their dry matter contains as high as twenty per cent. of ash. Nevertheless, the portion that is used at the factory contains a large quantity of fertilizing constituents. The following table gives a comparison of the fertilizing constituents contained in the saleable portion of various common crops:

AMOUNTS PER ACRE OF FERTILIZING CONSTITUENTS FOUND IN AVERAGE YIELD OF CERTAIN CROPS.

Crop.	Yield per acre.	Nitrogen.	Phosphoric acid.	Potash.	Value.
	tons.	lbs.	lbs.	lbs.	
Mangels	20	76.0	36.0	152.0	$18 26*
Turnips	17	61.2	34.0	132.6	15 33
Sugar Beets	14	61.1	28.0	134.4	15 23
Clover Hay	2	82.8	15.2	88.0	14 95
Timothy Hay	1¾	44.0	18.6	31.4	7 60
	bushels.				
Wheat	30	42.5	14.2	9.0	6 11
Barley	38	27.3	14.4	8.8	4 28

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*Based on the percentage of fertilizing constituents as compiled by Henry in "Feeds and Feeding."

And the same valuation is used as Armsby uses in his "Computation of Rations for Farm Animals," viz., nitrogen, 12 cents per pound; phosphoric acid, 4 cents per pound; potash, 5 cents per pound. As the valuations are based upon the cost of commercial fertilizers, they must not be taken as absolute.

This table shows that an average crop of sugar beets removes a smaller quantity of fertilizing constituents than an average crop of mangels; about the same as turnips and clover hay; and much more than timothy hay, wheat, or barley. Seldom are mangels, turnips, or clover hay sold from the farm; hence, of the crops ordinarily sold, the sugar beet is the most exhausting upon the soil, when there is nothing returned for what has been removed.

If the fertility is to be maintained, about the same quantity of fertilizing constituents as is removed in the crop must be restored to the soil. This maintenance of fertility may be accomplished either by returning the beet pulp, by purchasing other stock feeds or manure, or, partially, by growing leguminous crops. Beet pulp makes an excellent constituent of a ration (see Report for 1906), and it should be returned to the farm and fed wherever practicable. As it leaves the factory it contains generally about 90 per cent. of moisture, but by improved presses, the moisture may be reduced to 80 per cent. Even with the water reduced to 80 per cent., the pulp cannot be carried with profit long distances from the factory. Every ton of the pulp will contain from 1,600 to 1,800 pounds of water; and, therefore, the expense of transportation per 100 pounds dry matter is very great. Whenever the pulp can be returned and fed to the stock with profit, no farmer should fail to return it.

But the fertilizing value of the beet pulp is not so high per 100 pounds of dry matter as is that of the sugar beet before it is subjected to the process of sugar extraction. The statement that the beet sugar industry, since it sells nothing but sugar from the community, does not remove from the land any elements of fertility, is not strictly correct. Three samples were analysed here in the laboratory, one from the Berlin factory; another from the Wallaceburg factory; while the third sample was the factory portion of the sugar beet to which reference has already been made. The analysis of each sample was made in duplicate, and the figures obtained were as follows:

PER CENT OF FERTILIZING CONSTITUENTS.

Sample.	Per 100 pounds Dry Matter.	
	Ash.	Nitrogen.
Beet Pulp (Berlin factory)	4.08	1.60
" (Wallaceburg factory)	4.47	1.65
Average of Beet Pulp	4.28	1.62
Factory portion of Sugar Beet	5.68	1.87

To every 100 pounds of dry matter in the sugar beet, as taken to the factory, there are 1.40 pounds more ash and .25 pounds more nitrogen than in the same quantity of dry matter in the beet pulp. In order to compensate for the loss in removing 100 pounds of dry matter in sugar beets from the farm, if there were no other losses except at the factory, 133 pounds of dry matter in pulp must be returned. But there are other losses to consider;—

inevitable losses in feeding and handling must not be overlooked; so that, after making due allowance for all losses, there should be returned from 140 to 150 pounds of dry matter in pulp for every 100 pounds of dry matter in the beets removed.

Until the factories dry and grind the pulp to meal, farmers living at a distance from the factory cannot expect, on account of the cost of hauling, to return the pulp to the soil. It is necessary, therefore, to maintain fertility by some other means. For example, other feeding-stuffs may be purchased and fed, and the manure therefrom applied to the soil. The quality of these feeds required to supply the loss in selling sugar beets will vary according to:

(1) The quantities of the different fertilizing constituents contained in the seed.

(2) The class of animals to which it is fed. Growing animals and milch cows remove quite a large percentage of nitrogen and ash, while fattening animals remove but little of either. By referring to a table of the fertilizing constituents of the purchased feeds and by taking into consideration the class of animals to which the feed is to be supplied, and the probable loss in the manure, it may be readily calculated how much of the feeds are required to compensate in fertilizing constituents, for that removed by the sugar beets.

In order to maintain fertility, where it is not practicable to purchase other feeding-stuffs, the purchase of manure must be resorted to. Farmyard manure is a general manure, and where it can be procured at reasonable cost, it is probably better than the mineral manures. Besides containing the fertilizing constituents in very fair proportions, it has the advantage over the mineral manures of supplying organic matter, thus exerting a very beneficial influence upon the mechanical condition of the soil. To supply the loss, through the sale of a crop of sugar beets (of the average yield), in the form of sodium nitrate, superphosphate, and Kainite, these fertilizers must be supplied in the respective quantities of 400 pounds, 112 pounds, and 1,030 pounds per acre. It is not within the scope of this article to discuss the problem of the application of these fertilizers; but it may be mentioned here that in order to obtain their full value, and to prevent disastrous losses, they must be applied with an intelligent knowledge of their respective actions on the soil and on the growth of the crop.

It has become well recognized that leguminous crops, such as clover and peas, increase the fertility of the soil. By growing these crops it is possible to keep up the nitrogen supply more economically than by the application of artificial fertilizers. But it would never do to depend upon these crops for the supply of other fertilizing constituents, except for the small quantity brought from the subsoil and deposited either in the roots near the surface, or in the crop itself. The long tap roots of the clover and alfalfa extend more deeply into the soil than those of the other crops. Leguminous crops, however, are essentially nitrogen suppliers.

Conclusions.

(1) The statement that most of the ash of the sugar beet is contained in the crown which is left in the field is shown by analyses to be incorrect.

(2) The sale of sugar beets without returning the beet pulp is very exhausting on the soil; the pulp, therefore, should be returned to the farm whenever it can be fed with profit.

(3) There is in any case a loss of fertilizing constituents from the soil in a district where beets are grown for the production of sugars.

ASH CONSTITUENTS OF CEREALS.

When plants are subjected to chemical analysis their constituents are divided into combustible and incombustible matter, the latter usually being designated the ash. The figures given in this paper are the results of two methods of making a determination of the percentage and the analysis of the ash of a crop, and these results indicate that the figures representing the amount and analysis of the ash of different crops as given in our reference books are, to a certain extent, inaccurate. But of what importance is an ash analysis? The three main plant constituents of which the soil may become exhausted are: nitrogen, phosphoric acid, and potash; and when we consider the fact that the ash contains all of the last two, we can readily see that the accurate determination of the percentage of ash in a crop and the percentage composition of the ash are questions, which, in relation to soil fertility and soil exhaustion, are of the most vital importance both to the scientific and practical agriculturist.

A method by which accurate ash percentages and analyses may be obtained has been, among all agricultural chemists, a long felt want. In burning a substance to an ash according to the official method, chemical changes take place which greatly alter the real quantity and composition of the ash. Natural products, as straw, hay and grain, contain large amounts of carbon to drive off which a high degree of heat is required. This high heat causes portions of the ash to fuse or liquidize, in which state, some of the constituents, as the potash, lime, iron and magnesium unite with the silica to form silicates. These silicates are insoluble in hydrochloric acid (the solvent used) and thus the analyses show a lower percentage of these constituents and a higher percentage of silica than the ash actually contains. Then again this high heat causes some of the phosphoric acid, chlorine, and sulphur to volatilize and thus the figures for these substances are lower than they should be.

Some years ago Dr. A. E. Shuttleworth, then chief chemist at the Ontario Agricultural College, recognizing these defects in the chemical analysis of an ash, endeavoured to obtain a method by which some of the errors might be rectified, and we are pleased to say that the method, devised by him, overcomes in part, at least, the defects in the official method which have just been mentioned. In the report of this College for 1899 he says: "To obtain a method giving accurate ash percentages and analysis, I conducted an extensive series of analysis of natural products (straw, hay, grain, etc.), and artificial silicates. In these analyses attention was given first to the determination of crude ash in a sample of oat straw by the ordinary method of incinerating the dry material in an open platinum dish. During the process, different degrees of heat were employed with different samples. Those samples receiving the highest heat yielded the lowest percentage of ash, and those gently heated yielded the highest. But the ash prepared by the high heat yielded high percentages of silica and low percentages of potash, while ash prepared by the low heat yielded high percentages of potash and low percentages of silica. An analysis of the silica separated from the highly heated ash showed that it (the silica) contained portions of the other ash constituents, viz., lime, magnesium, potash, etc. This circumstance led me to prepare mixtures of pure silica, potassium carbonates and calcium carbonates of known quantities, which after being moistened with citric acid and dried, were subjected to different degrees of heat corresponding to the conditions in regular ash determinations by the ordinary method. An analysis of these mixtures, after heating, gave results quite similar to the results of the above samples of ash prepared from oat straw, *i.e.*, the highly heated mixtures yielded high percentages of silica, owing to the lime and potash of the mixtures uniting with the silica and forming silicates, which are indecomposable in hydrochloric acid.

"After trying many substances, I found that the addition of a solution of acetate of lime to the dry substance prevented the formation of indecomposable silicates during incineration at any temperature."

By this extract, from Dr. Shuttleworth's report, we see that the addition of a solution of calcium acetate apparently obviates the difficulty of burning a substance to an ash, and prevents the union of the lime and potash with the silica.

Having found a means of preventing the formation of insoluble silicates the Doctor endeavoured to discover a method of preventing the volatilization of chlorides. He eventually designed a special form of apparatus composed of platinum and provided with lids, cylinders, and openings in which, he claims, that the material, moistened with acetate of lime solution and dried can be completely incinerated without the slightest loss of chlorides.

Having briefly considered the difficulties met with in making an ash determination and analysis, let us now turn our attention to the results obtained and see what conclusions we can draw from them. The figures below represent the analysis of the ash of Herison Bearded Wheat. This is a winter wheat and was grown under ordinary field conditions. The percentage of ash has been calculated on the amount of water free substance and the percentage of ash constituents on the amount of carbon free ash. The figures obtained are as follows. The figures by Wolff representing the composition of the ash of wheat are also given.

ANALYSIS OF ASH IN THE GRAIN.

——	Shuttleworth Method.	Official Method.	Wolff.
Per cent. of Ash	2.21	2.00	1.96
" SiO_2 in Ash	1.17	2.46	1.96
" Fe_2O_3 "	2.40	1.52	1.28
" CaO "	4.71	2.17	3.25
" MgO "	10.00	7.15	12.03
" P_2O_5 "	33.26	31.23	47.22
" K_2O "	26.51	18.43	31.16
" SO_3 "	1.81	2.26	.39
" Na_2O "	9.10	11.41	2.07

Chlorine undetermined.

ANALYSIS OF ASH IN THE STRAW.

	Shuttleworth Method.	Official Method.	Wolff.
Percent of Ash	9.45	5.75	5.37
" SiO_2 in Ash	28.31	49.17	67.50
" Fe_2O_3 in Ash	2.01	1.90	.60
" CaO in Ash	8.25	6.24	5.76
" MgO in Ash	4.10	2.20	2.48
" P_2O_5 in Ash	3.50	2.35	4.81
" K_2O in Ash	39.13	16.42	13.65
" SO_3 in Ash	2.69	1.75	2.45
" Na_2O in Ash	15.25	18.97	1.38
Chlorine undetermined.			

From what has been said previously regarding the effectiveness of the new method in preventing the volatilization of chlorids, etc., and in preventing the formation of insoluable silicates, it should be an easy matter for us to draw certain conclusions from these figures. In the first place we get more ash by the new method; having .21 per cent. more in the grain and 3.70 per cent. more in the straw. The loss in ash by the official method is due to the volatilization of the phosphoric acid and chlorides. In the second place, we see that there is quite a variation in the composition of the ash as determined by these two methods. We call the attention of the reader, more particularly to the variation in the amounts of silica, lime, potash, and phosphoric acid, as these, from an agricultural standpoint, are the most important constituents. For the sake of convenience we give the amounts of these again.

Substance	Method.	SiO_2 p. c.	CaO p. c.	P_2O_5 p. c.	K_2O p. c.
Grain	Shuttleworth's.............	1.17	4.17	33.26	26.51
"	Official.....................	2.10	2.17	31.23	18.43
Difference .	....	....	2.54	2.03	8.08
Straw.......	Shuttleworth's.............	28.31	8.25	3.50	39.13
"	Official.....................	49.17	6 24	2.35	16.42
Difference .	....	....	2.01	1.15	22.71

In each case we get more silica by the official than by the new method, having .93 per cent. more (nearly twice as much) in the grain and 20.86 per cent. more in the straw. But in each case we, on the other hand, get more lime, phosphoric acid and potash by the new method. In the straw we have over twice as much potash by the new method and also have quite a quantity (8.08 per cent.) more in the grain. We get 2.54 per cent. more (over twice as much) lime in the grain by the new method and 2.01 per cent. more in the straw. In both cases we get more phosphoric acid by the new method. This greater amount of phosphoric acid is due to the prevention of its volatilization. Part of the potash by the official method is lost by volatilization but the greater part of the loss of this substance, as well as the loss of time, is due to the formation of insoluble silicates. The addition of the calcium acetate solution, as previously stated, prevents the fusing together of certain salts and thus the ash remains in a form in which it is easily dissolved by hydrochloric acid. The alkali neutralises the large amount of silicic acid in the straw and the phosphoric acid in the grain.

Let us now consider very briefly the figures given by Wolff representing the analysis of winter wheat and compare them with our figures. Naturally, you will expect them to correspond favorably with the figures in the column headed "Official Method," but it will be noticed there is considerable variation. There are several ways by which this variation can be accounted for. In the first place, our figures are the results of the analysis of but one crop while those given by Wolff are the average results of a great many analyses. Then, again, the amount and chemical composition of the ash of a crop is influenced, to a greater or less degree, by the species, the stage of growth, the soil, the fertilizers used, the available moisture and the thickness of the stand. Hence it will be seen that the figures by Wolff, given above, will be of little use to us without some other data and, therefore, in the following table will be found three columns of figures, the first representing the ash analysis of the straw of Herison Bearded Wheat as obtained by the Shuttleworth Method, and the second giving the average analysis and the third the variations in the analyses of the ash of the straw of winter wheat as compiled by Wolff.

VARIATIONS IN THE ASH ANALYSIS OF WINTER-WHEAT STRAW.

	Shuttleworth Method.	Average.	Variation.
	%	%	%
Total Ash	9.45	5.37	4.5—7.0
SiO_2	28.31	67.50	49.6—72.5
K_2O	39.13	13.65	9.5—27.4
CaO	8.25	5.76	2.7—8.9
P_2O_5	3.50	4.81	2.2—8.9

It will be seen upon comparing these figures that the results obtained by the Shuttleworth method are very conclusive. The maximum amount of ash ever obtained by any official method is 7%, while, by the new method, we obtained 9.45%. The minimum amount of silica ever obtained is 49.6% while we, by the Shuttleworth method, obtained 28.31%; then again, we obtained by the new method 8.25% of lime as compared with a minimum of 2.7%, a maximum of 8.9% and an average of 5.76% obtained by official methods. We can say nothing definitely in regard to the phosphoric acid.

Before the time of DeSaussure, this subject, the chemical analysis of the ash of plants, had been given a great deal of attention by agricultural chemists. The inaccuracies occasioned by the combustion of the organic matter were recognized by such men as Baumert, Councher, and Von Schroder, who, in order to make accurate sulphur determinations, recommended the use of a specialized alcohol lamp for incineration. Then again W. Mayer found that, by adding potash and saltpeter to the substance before incinerating, he could save a large quantity of the sulphur, and Elbricht, with the same object in view, treated clover leaves, by heating in nitric acid and drying and then incinerating with saltpeter and potassium carbonate, for the same purpose. Many different forms of apparatus have been proposed to regulate the admission of air to the substance (chlorides, sulphides, etc.) while being burned, and, at the same time to retain the volatile substances. The Shuttleworth platinum dish used in this work is one of these. An apparatus similar to the one devised by Dr. Shuttleworth was at the same time proposed by Tucker. The main chamber of the Tucker apparatus is conical in shape and the air, instead of being forced in, is drawn through by means of an aspirator. To catch the volatile substances the air drawn off is passed through a small flask containing water. The platinum stirrer passes down the inlet tube. This apparatus is becoming more popular and more generally used than the Shuttleworth apparatus, owing, doubtless, to its simplicity of construction and ease of operation. The conical form of the Tucker apparatus is also preferable, as it allows the heat to be applied more uniformly. H. Wislicenus recently described an apparatus which embodies the principle of the Tucker apparatus, but consists only of a cover which may be adapted to dishes and crucibles ordinarily found in chemical laboratories.

Besides a solution of calcium acetate, with a known calcium content as used by Doctor Shuttleworth, many other admixtures, to facilitate incineration and prevent the fusing of salts, have been used. Kassner mixed calcium plumbate with the dry substance, but this, although facilitating the burning, interfered with the later analysis of the ash. Bismuth Nitrate used by Bechamp gave the same result. Donath employed such admixtures as pumice stone, copper oxide, clay and magnesia, but found them inferior to incineration at first in dilute and later in pure oxygen. H. Wislicenus recently suggested moistening the greyish ash with pure hydrogen peroxide, which he claims facilitates the complete combustion of the carbon. Strecker has employed the addition of baryta, Way and Ogstone, barium nitrate, Slater barium superoxide, Wackenroder lime, as calcium carbonate, and calcium acetate, all with good results. Von Schroder and Reuss added sodium carbonate previous to charring to prevent the loss of chlorine, and sulphuric acid in forest products.

Thus, it will be seen, that the ash analysis of plants is a question which has been extensively investigated by our most prominent chemists. The subject, however, is a very wide and important one, and one which still presents an inviting field for thorough and exact research. Such researches, in the present status of our knowledge, are much to be desired and we hope, that before many more decades of time have passed, we shall have found methods by which the ash of all kinds of plants can be accurately and correctly determined.

Condimental and "Stock Foods".

Name of Feed	Crude Protein.	Moisture.	Ether Extract.	Crude Fibre.	Ash.	Nitrogen free Extract.
1. Carnafac	16.09	7.32	3.98	14.11	10.99	47.51
2. Columbia Regulator (Columbia Stock Food Co. (Detroit)	10.72	7.42	5.02	9.52	22.28	45.22
3. International Stock Food	11.06	10.32	2.61	7.90	16.87	52.24
4. Myer's Cattle Spice and Cattle Food	11.27	7.24	1.89	8.93	30.43	40.24
5. Myer's Spice	13.42	12.25	3.47	6.99	18.75	45.12
6. Anglo-Saxon Stock Food (Nesbitt Co., Ltd.)	19.25	8.05	6.44	14.93	10.73	40.60
7. Dr. Hess's Stock Food	12.34	7.48	1.80	7.37	22.41	48.60
8. Stock Compound (Dr. Scott)	14.51	7.20	2.96	7.26	16.06	51.95
9. Pratt's Animal Regulator	9.72	9.21	4.50	4.21	11.35	61.01
10. Bibby's Cream	13.50	10.15	6.11	3.92	4.12	62.20
11. Herbageum Stock Food	21.10	7.15	4.82	9.29	14.03	43.61
12. Stock Food (The Beaver Mfg. Co., Galt)	20.68	6.98	5.32	8.34	13.59	45.09
13. Rust's Egg Producer	19.03	8.82	4.21	5.15	61.30	1.49
14. Dr. Hess's Panacea	11.20	10.41	1.75	3.47	39.04	34.13
15. Pratt's Horse and Cattle Feed	11.63	10.24	2.27	5.31	6.70	63.85
16. Calf Meal (American Cereal Co., Peterboro)	23.27	10.20	2.51	5.54	4.61	53.87
17. Stock Food or Cattle Spice (The Beaver Mfg. Co., Galt)	18.64	8.21	2.77	7.45	6.01	56.92
18. Standard (Ame & Co., Boston)	14.54	11.50	4.59	4.61	5.37	59.39
19. Acme Stock Food	23.51	7.42	7.39	7.04	8.04	46.60
20. Worthington's Stock Food	13.24	8.78	3.25	11.30	12.15	51.28
21. Anglo Saxon Stock Food	19.25	8.07	6.49	14.72	10.76	40.71
22. Anglo Saxon Stock Food	19.91	5.00	8.84	14.71	8.70	42.84
23. Victor Stock Food	12.19	9.41	1.36	12.15	5.22	68.67
24. Canadian Stock Food	14.58	7.88	4.95	10.55	7.56	54.48
25. Columbia Stock Food	11.56	6.39	4.69	9.15	22.11	46.10
26. Dr. Scott's Stock Food	17.15	11.50	5.17	5.47	4.49	56.21
27. Carnafac	14.63	6.93	3.28	13.20	11.46	50.48

The samples of condimental and "stock foods" reported above were secured in most cases from fresh stock out of unbroken packages. In addition to the chemical analysis, a few of the samples were subjected to a careful microscopic examination. The chemical analysis alone gives valuable information as to the total quantities of important food materials contained in the feeding stuff. But the information obtained from a combined chemical and microscopical examination must be of still greater value to feeders of live stock.

We give the results of our microscopic examination:

Carnafac: Linseed, wheat starch, charcoal.

Columbia Regulator: Wheat starch granules, bran, charcoal.

International Stock Food: Mostly wheat offal, some charcoal, and cayenne.

Myer's Cattle Spice and Cattle Food: Fenugreek, linseed, maze, seeds, etc.

Myer's Spice: Corn, cotton seed meal, seeds, cayenne, fenugreek, saltpetre, sulphur, salt, and turmeric.

Pratt's Animal Regulator: Corn, wheat offal, fenugreek, gentian, salt, charcoal.

Bibby's Cream: Wheat, maize, linseed.

Herbageum Stock Food: Linseed, wheat, charcoal.

We have been unable to find time to make a microscopic examination of the other stock foods listed.

It is not claimed that the number of ingredients identified in the above foods is complete. It is believed, however, that the examination is sufficiently complete to give a fair idea of the general character of such feeds. We have found them to consist largely of ordinary grains and concentrates, as wheat by-products, corn meal, and linseed meal. In some cases linseed and cotton seed meal have been added, obviously to increase the amount of protein. Occasionally mustard hulls and weed seeds are noted, used, evidently, as a filler.

In addition to the various cereal by-products these foods contain small quantities of a variety of substances, most of which possess simple medicinal properties, to which, we understand, is attributed the wonderful nutritive and curative properties claimed for them.

The nutritive value of "Stock Foods" is thus shown to be no greater than that of the ordinary grains of which they are largely composed. Their medicinal value depends largely upon the aromatic seeds and roots used as a tonic for the stomach, on charcoal as an absorbent, and on the purgative effect of Epsom and Glauber salts. The quantity recommended to be fed is usually so small, that very little nutritive effect can be expected unless the material be fed for a considerable length of time. While it is probably true that some of these stock foods may prove beneficial under certain conditions, it is also true that many of them are heterogeneous mixtures, which, from a nutritive standpoint, are in most, if, indeed, not in all, cases not worth more than many of the by-products from our mills. Very few feeders would entertain the idea of purchasing these mixtures at the price asked, because of any particular nutritive value they may possess. Indeed, as feeds, pure and simple, the prices paid for "stock foods" are ridiculously high when compared with the prices paid for our most expensive standard feeds.

Another strong objection to the use of "stock foods" is the fact that they are anything but constant in composition, as chemical analyses have abundantly demonstrated. But it may be objected that the composition of even our standard feeds, bran, shorts, etc., is likely to vary within wide limits—a statement all too true, because of accidental or intentional adulteration. It must be admitted, however, that the purchaser of commercial feeds can, in many or most cases, detect the presence of low grade materials in bran, shorts, middlings, gluten meal, etc., whereas in the so-called "stock foods" such substances are hidden by finely ground charcoal, anatto, etc. Furthermore, the composition of the standard feeds, bran, etc., if unadulterated, is fairly constant. Hence, it seems only rational to favor the standard by-products for the nutritive effect. It must be admitted, however, that practice has shown that a good stock food has a place in improving the condition of an animal whose system is run down, also in finishing an animal for exhibition purposes, where cost is not the prime consideration.

The question of comparative values of feedstuffs is a live one in Ontario to-day. The shortage of roughage and grains has been the means of causing many feeders of live stock, particularly dairymen, to consider the advisability of purchasing certain commercial feedstuffs, for which, heretofore, they have had little or no use. The direct effect has been to stimulate a spirit of inquiry which demands all our efforts to satisfy. As evidence of this, we may point to some thirty odd feedstuffs which we analyzed during the year at the request of farmers and millers throughout the Province. In this connection I may say that there is an ever increasing demand for such work, and we believe it to be of the highest importance.

As it is scarcely possible to enter into a discussion relative to the merits of the various feedstuffs without some knowledge of the animal requirements, the following facts should be borne in mind. First, the lives of none of our farm animals can be sustained by protein, or fat, or carbohydrates, or ash alone; and yet protein, carbohydrates and ash of the feed are all absolutely necessary to sustain life and produce growth and milk. Experiments proving the above facts teach us that for the securing of specific ends, such as the production of flesh, fat or milk, these several groups of substances, as found in our various feed stuffs, should not, for economical reasons, be fed at haphazard, but rather in reasonably definite proportions, depending on the end sought. Second, a feed is valuable as a source of nourishment only so far as its various constituents can be digested and assimilated. Third, cows of 1,000 pounds weight need approximately 16 pounds of total nutrients daily. Animals that are very thin in flesh, especially when fresh in milk, can consume two or three pounds more to advantage. Of these 16 pounds, approximately 2.5 pounds of protein is necessary, in order to enable the cow to produce large and continuous yields of milk. For milk production, cows need about five times as much carbohydrates as protein. These proportions cannot, of course, be followed with mathematical accuracy. Cows differ in their ability to turn feeds to the best account, and the judgment of an experienced feeder is always necessary if the best results are to be obtained. In all feed combinations palatability must also be carefully considered.

If a cow should be fed all she would consume of any palatable dry, coarse fodder, such as good quality of hay, she would have at her disposal the following digestible nutrients approximately: Protein, 1.4 lbs.; fat, 0.4 lbs.; carbohydrates, 12.4 lbs.; total, 14.2 lbs.

It is very clear that such a ration lacks in protein, as well as in total digestible matter. In order to overcome these deficiencies, recourse is had to the concentrated feeds rich in protein, and sufficient are added to increase the protein to the necessary amount. By this addition of concentrated feeds, the necessary total nutrients will also be obtained. The protein is the most expensive of the three groups of nutrients, therefore the writer is not sure that it would be economy in all cases to feed 2.5 pounds. It is possible that the conditions in many cases are such that two pounds daily would be more economical. In other cases, it might be wise to feed as high as three pounds daily.

Having briefly considered the principles on which a rational system of animal nutrition is based, the next step is to classify the feeds and consider their comparative value.

Below 12 per cent. may be termed low protein, from 12 to 20 per cent. medium protein, and above 20 per cent. high protein. If we examine published analyses of feedstuffs, we shall see that hay is low protein, and this applies to all coarse fodders, excepting the legumes. These latter are medium protein. The grains have the same type of composition as do the hays and straws with this exception, that they contain a much lower percentage of crude fibre, and, hence, are very much more digestible. The grains may be regarded as concentrated hays, having approximately one-third more nutritious matter than the latter. The hays, roots, and grains have from nine to thirteen times as much carbohydrates as protein. The legumes (clover, pea, and bean fodders) contain more protein than do the hays and grains, having about five times as much carbohydrates as protein.

COMMERCIAL FEEDSTUFFS.

――	Protein.	Moisture.	Fat.	Fibre.	Ash.	Nitrogen free extract.
Molac horse feed	10.31	8.80	4.14	12.30	6.00	58.45
Molac dairy feed	14.87	7.37	4.68	11.10	5.35	56.65
Bran	15.37	7.81	3.30	7.75	5.28	60.50
Bran	13.18	8.88	3.07	12.32	5.42	57.13
Bran	12.28	9.20	2.50	12.79	4.35	58.88
Bran	11.93	8.74	2.91	13.09	4.47	58.86
Bran	11.20	9.15	2.19	14.10	3.69	59.66
Shorts	15.14	11.32	4.47	7.20	4.65	57.22
Buckwheat feed (bran and shorts)	17.00	11.84	3.28	11.53	3.22	53.13
Buckwheat feed	13.50	13.28	2.90	6.47	2.87	60.87
Gluten feed	23.25	7.68	5.83	5.72	1.14	56.38
Gluten liquid	1.59	87.91	1.03	.43	.22	8.82
Gluten meal	35.41	11.20	2.11	5.35	3.34	54.27
Oil cake (meal)	34.81	9.45	7.42	7.35	5.40	35.57
Linseed meal	23.87	8.90	28.61	6.10	5.39	27.13
Oil cake (nut)	27.54	9.68	4.32	12.17	6.01	40.28
Whole linseed	20.95	7.90	31.98	4.75	3.65	69.23
Malt combings	20.88	10.79	2.32	12.56	5.74	47.71
Corn meal	7.47	10.30	5.37	1.26	1.50	74.10
Cotton seed meal	42.10	8.50	13.01	5.62	7.25	23.97
Beet meal (Wallaceburg)	6.50	8.00	0.88	17.30	4.66	62.66
Rice meal	12.25	9.82	13.70	5.21	7.77	51.05
Rice feed	12.37	9.11	11.55	10.42	8.75	47.80
Feed (Tillson & Co.)	14.20	11.20	4.67	9.62	4.91	55.40
Feed (W. R. Flatt)	11.38	9.04	4.45	8.42	5.51	61.20
Feed (W. R. Flatt)	8.03	9.67	2.51	11.50	3.67	64.62
Sample feed	9.63	14.28	2.00	6.95	7.96	59.18
Bean meal	23.73	11.20	2.11	5.35	3.34	54.27
Molassine	9.63	3.46	0.13	11.28	10.62	65.24
Manitoba weed seeds	13.84	9.82	4.47	4.78	3.19	63.90

In our discussion thus far we have emphasized the importance of protein. This constituent we believe is of prime importance, because, as we have seen, it is the component in which home-grown feeds are likely to be deficient. Commercial feedstuffs, therefore, are valuable chiefly in proportion to the protein they contain. An exception to this must be made in the case of our cereal grains. These have practically the type composition of the various coarse fodders, differing in that they contain much less crude fibre and consequently are much more digestible. They are, therefore, to be used more as producers of fat and energy than as furnishers of protein.

The concentrated feedstuffs in the above table we may divide into three classes, depending on the quantity of protein they furnish. For practical purposes in combining these feeds into rations, those in each class may be regarded as having equal values, the market prices governing the selection. Other things being equal, however, those having the highest protein content in the class are to be preferred.

It must be admitted that some of the feeds on our list give better returns than might be expected from a casual glance at the table of composition. Molac dairy feed, for example, is not amongst the feeds of class I., as regards protein content, and yet our experience with this feed leads us to regard it as a valuable component of a dairy ration. Molac dairy feed is very palatable and cattle eat it greedily. Moreover, when fed to dairy cows instead of bran, the flow of milk was not appreciably decreased. It will not escape notice that this feed is not very different in chemical composition from pure wheat bran. It must be remembered, however, that Molac is a prepared feed and not a pure by-product, hence the composition of the feed is not likely to be constant.

Bran is one of the safest feeds that can be fed to farm animals. It does not cause digestive disorders even when fed in large amounts. It can be combined with and made to improve any kind of feedstuff. It is invaluable as a component of a ration for milch cows, and can be fed to all classes of live stock.

From the analyses given in the above table, it might be supposed that the protein content would put wheat bran into the lowest grade (below 12 per cent.). I may say, however, that the protein content of pure wheat bran rarely falls below 14 per cent., and if the percentage of protein falls below this figure we may be suspicious of the presence of foreign materials. Four out of the five samples of bran herein reported were adulterated with finely ground oat hulls.

The buckwheat by-products find their chief place as pig feeds. The two samples analyzed contain a fair percentage of protein. But the composition of feeds is likely to be quite variable because the material is not in all cases a pure by-product.

Of the maize feeds, gluten meal is the most valuable, as it contains the highest percentage of protein. Corn meal is not a milk producer; but it is an excellent component of a fattening ration. Gluten feed does not contain as high a percentage of protein as gluten meal, and, furthermore, it is frequently found to be heavily adulterated, so that the composition is anything but constant. In our examination of these feedstuffs we have frequently found the gluten feed sold under the name gluten meal, a designation altogether misleading, as the two feeds are quite different. The one, gluten meal, is, or should be, a pure by-product obtained in the manufacture of starch. Gluten feed is a mixture of materials, chiefly germ and hulls of maize, though other materials may also be present.

The flaxseed feedstuffs are all high grade, with the possible exception of oil cake, which in some cases is a heterogeneous mixture. As will be seen from the above analyses the sample of oil cake analyzed was of excellent quality. It is evidently the pure linseed cake. Samples of oil cake have, however, come under our notice which contained linseed and admixture of other seeds, as well as screenings and sweepings from the mill. It is, therefore, better policy to purchase linseed meal, as the quality of this material can be depended upon.

Cotton seed meal is an extremely high-grade feedstuff. It should be fed with caution, however, as amounts exceeding 1 to 1½ pounds fed daily to milch cows are likely to cause serious derangement of the animal system. In small amounts it is an excellent component of a dairy ration. Cotton seed meal should never be fed to young pigs.

A striking exception to the rule, that feedstuffs with low protein content are of little value, is seen in the case of sugar beet meal. This meal is simply the beet pulp thoroughly dried and pulverized. When this meal is moistened it supplies a succulent food at a time when such feed is either not available or too scarce; and its effect upon stock seems to be much more favorable than chemical analyses would indicate. To its actual nutritive effect as a feed should be added its general effect on the quality of meat and milk. Furthermore, beet meal or pulp undoubtedly overcomes much injurious effects of dry and concentrated feeds, puts the system in a good sanitary condition, and so stimulates the appetite that there is less waste of other feeds, quantities of which are otherwise generally discarded. Beet meal or pulp supplies material which dilutes, softens and separates the particles of dry hay and grain, so that the nutritive quantities of the whole may be greatly increased or rendered more efficient.

The materials labelled "feeds" in the foregoing table require little comment. The analyses show them to differ widely as regards composition. Furthermore, the figures for protein show them to be little better than ordinary farm roughage. A brief analysis of the table reveals that in one case only does the percentage of protein exceed 14. These materials are, therefore, not to be recommended as components of rations for dairy cows. In fact, the prices demanded for "feeds" are in most cases too high.

An analysis of one sample of "stock food" is reported in the above table. As will be noticed, the protein content is very low, so also is the fat. The material is, therefore, low grade. Attempts have, nevertheless, been made to assign to it a higher feeding value than oats or barley. A comparison of the figures given in the above table with those for oats and barley (Henry's Feeds and Feeding) is sufficient to show that such claims are misleading.

The analysis of Manitoba weed seeds herein reported would lead us to regard the material rather favorably. But the feeding of this material has not sustained this opinion. As a result of our work with Manitoba weed seeds we are forced to believe that it is altogether unfit to feed to poultry. Mr. Graham fed this material to a flock of chickens and many of them died. It is believed that the weed seeds contain aromatic compounds which are poisonous to poultry.

In conclusion, permit me to say that although a great deal of labor has been expended in determining the composition and relative values of feedstuffs, yet much remains to be accomplished. We believe it to be a most fruitful field for research, and would, therefore, respectfully call your attention to the urgent need for a larger grant for this work. We feel certain that the results would amply repay any moderate expenditure in this direction.

Respectfully submitted,

W. P. GAMBLE.

November 26th, 1907.

PART VIII.

THE PROFESSOR OF VETERINARY SCIENCE.

To the President of the Ontario Agricultural College.

Sir,—I have the honor to submit my annual report for the year 1906-1907.

Class Room.

The Class Room work has been practically the same as in previous years.

First Year. To this class during the fall term I gave a course of lectures on Veterinary Anatomy, taking up principally the anatomy of the horse and noting the principal differences between his anatomy and that of the ox. While we do not study anatomy in minute detail we endeavour to give the students sufficient instruction on the skeleton, muscles, tendons, ligaments; digestive, respiratory, urinary and genital systems, foot, eye, and skin, to enable them to be good judges of horses and appreciate the common diseases to which they are subject. We endeavour to make all lectures and illustrations as practical and interesting as possible. To this year we also gave a course of lectures on building stables, as regards site, drainage, ventilation, kinds and arrangements of stalls, floors, etc.; the care and management of horses, harness, vehicles, etc.; and a course in Veterinary Materia Medica, speaking of the mode of action of medicines, the different methods of administering the same, with the advantages and disadvantages of each; the qualities, actions, uses and doses of the drugs commonly used for the prevention and cure of the ordinary diseases of farm stock. In addition we gave practical illustrations of scoring and judging the different breeds and classes of horses, using for such purposes the horses kept at the institution and some from my own stable.

Second Year. To this class I gave a course of lectures on the diseases of stock, noting the causes, symptoms and treatment, both preventive and curative. During this course, when possible, we illustrated by specimens or a living animal, the differences between a healthy and diseased organ, making all points as simple and practical as possible. We also gave a course of lectures and illustrations on Veterinary obstetrics, noting the phenomena of conception, gestation and parturition; the causes, symptoms and treatment for the different diseases of both dam and offspring incident to the parturient state, and until the young has reached weaning time. In addition we continued instructions in horse judging, handling colts, etc.

Third and Fourth Years. With these classes we continued the subject of horse judging, using for the purpose the horses at our command, and visiting the premises of breeders, importers, and dealers.

Special Dairy Class. To this class we delivered a short course of lectures on the ordinary diseases of dairy cattle, with the causes, symptoms and treatment, both preventive and curative.

Short Course in Stock Judging. This course, which was held in January had a larger number of students than in any previous year. As usual we gave a course of practical scoring and judging of the different breeds and classes of horses. In this I was ably assisted in all classes by Dr. Standish of Walkerton. As on former occasions, we depended largely upon the kindness of local breeders, importers, and dealers for horses to make up classes, and I wish to take this opportunity of publicly thanking Messrs. Sorby, Aitcheson, McConnell, Hurley, Stewart, Tovell, Bowman, and others who so kindly aided us.

Horse Breeding. Our two Clydesdale mares were bred in the spring of 1906, and both proved in foal, but our best mare was unfortunate enough to abort in January. The other mare produced a good foal. During the spring of 1907, Prof. Day purchased another Clydesdale mare, and she and the other two were bred, and appearance indicate that they are all in foal.

I would like to draw the attention of the Department to our urgent need of a stable for breeding mares and colts. All available space in the horse stable is occupied, and it is absolutely necessary, if breeding operations are to be continued, to provide suitable accommodation.

DISEASES AND INJURIES TO STOCK.

While we have had cases of the usual diseases and injuries in all classes of stock, I am pleased to be able to state that we have had no fatalities except in newly born animals.

Respectfully submitted,

J. H. REED.

PART IX.

THE PROFESSOR OF DAIRY HUSBANDRY.

To the President of the Ontario Agricultural College:

Sir,—I beg leave to submit my seventeenth annual report of the Dairy department of the College. As intimated in my last report, the Dairy Herd was transferred at the beginning of the present year to the department of Animal Husbandry. This allowed more time for experimental work, and for enlarging the commercial branches of the Dairy department.

Early in the Spring we purchased the plant and goodwill of a small creamery which was owned and operated by Mr. T. P. Carter, Guelph. This gave us more raw material for experimental and teaching purposes. Still our supply is not large enough to meet the wants of the department in furnishing practical instruction in the manufacture of cheese and butter during the College term. This is especially true with reference to milk for cheesemaking, as the farmers about Guelph seem loath to part with their skim-milk. We have paid the current prices for milk fat, and offered in addition, 20 cents per 100 lbs. whole milk in lieu of the skim-milk, if patrons would leave the skim-milk with us. Even at this price we were very short of milk for experimental cheesemaking during the summer, and for practical instruction in cheesemaking during the fall term.

The following table shows the amounts of milk and cream received during the year, the amounts of butter and cheese made, money paid to patrons, and cash receipts from sales of cream, butter and cheese, from December 1st, 1906, to November 30th, 1907:

Statement of Milk and Cream Received, Butter and Cheese Made, and Cash Paid and Received, December 1, 1906, to November 30, 1907.

Month.	Lbs. milk, cream received.		Lbs. milk manufactured into		Lbs. manufactured.		Cash Statement.	
	Milk.	Cream.	Cheese.	Butter.	Cheese.	Butter.	Paid Patrons.	Received.
December, 1906	97,166	3,551	402	88,605	42	5.692	$1,222.54	$1,374.52
January, 1907	78,872	7,484	19,650	56,880	1,970	4,318	1,406.89	1,191 84
February	65,884	7,603	20,750	45,637	2,130	4,175	1,416.16	1,287.65
March	68,180	8,920	20,576	49,345	2,014	4,751	1,458.15	1,797.71
April	29,778	9,901	5,400	24,378	507	3,874	894.12	1,347.66
May	41,993	15,223	13,841	28,152	1,315	5,438	1,429.36	1,384.41
June	56,390	25,139	28,094	28,498	2,799	9,305	1,778.66	1,926.89
July	58.574	32,272	25,140	33,419	2,422	10,827	2,203.48	2,358.24
August	45,718	23,477	17,205	28,216	1,673	8,114	1,612.40	2,067.50
September	30,306	15,672	4,860	25,446	472	5,997	1,224.79	1,749.46
October	22,958	11,054	6,475	16,503	711	4,161	928.62	1,307.34
November	19,114	9,180	5,245	12,709	561	3,256	755.40	927.35
Totals	614,933	169,476	167,638	437.788	16,616	69,908	$16.330.57	$18.720.67

I am under special obligations to my assistants, Messrs. Stratton, Ralph and Taylor, and to the Instructors of the Dairy School. The Chemical and Bacteriological departments have rendered valuable aid, especially during the short courses in Dairying.

TEACHING.

There is not much variation from year to year in the number of lectures and amount of practical work given to students. The Dairy lectures and practical work for the regular College students are nearly all given in the Fall term, as our plant and Instructors are fully occupied with special dairy classes from January 2nd, to about the middle of April each year.

The attendance at the special dairy courses was sixty-one during the year. The total number was less than last year but a larger proportion than usual staid during the full term and wrote on the final examinations. In 1907, thirty-four students wrote on the examinations at the end of three months term. In 1906, twenty-nine took the examinations.

The following have applied for Diplomas in Butter and Cheese making during the year.

Name.	Address.	Diploma in
Baxter, J. P.	Mackinac, Man,	Buttermaking.
Fockler, P.	Eganville, Ont	Buttermaking.
McLean, Alex	Lorneville, Ont	Buttermaking.
Reid, Wm	Camlachie, Ont	Cheesemaking.

OFFICIAL TESTING OF COWS.

During the year we have supervised official, seven and thirty day tests, for sixteen breeders of dairy cattle, comprising altogether 73 cows tested. There are a few breeders whose names are not on the list owing to the fact that for some reason or other the test was not completed, or the results were below the standard set, or the breeders preferred not having the test published, hoping for better results at some future time. The number of those conducting official tests would have been larger during the year had we been able to send supervisors at all times when asked for. We had a number of applications for men to supervise official tests which we were unable to grant, because competent men were not available.

We trust that we may be allowed one man who would give practically his whole time to this work during the winter when the demand for official testers is greatest. During the summer when not engaged in this work, he could be profitably employed in the dairy department assisting in experimental work.

The Canadian Holstein Association very properly acceded to our request that they purchase five travelling Babcock test outfits, and also five spring balances, for conducting official tests. The glassware has been tested at the Chemical Laboratory of our College and marked correct. Two of these outfits have been sent to the Dairy School at Kingston, so that breeders in the Eastern part of the Province may avail themselves of tested Babcock glassware and suitable machines without having to send to Guelph for the same. Sometimes official testers are sent out by the Superintendent of the Eastern Dairy School. The official reports are sent to us and signed by the head of the Dairy Department of the College before forwarding to the Secretary of the Breeders' Association. This plan reduces the travelling expenses of the Official Tester for Breeders in Eastern Ontario, but the accuracy of the results are vouched for by us, we assuming the risk that the person sent by the Eastern School is competent, on the recommendation of the Superintendent of said Dairy School.

The following is the list of Breeders for whom we have conducted Official Tests between November 11th, 1906 and November 11, 1907.

Name of Breeder.	P. O. Address.	Breed.	No. of cows tested.
H. Bollert	Cassel	Holstein	7
W. W. Brown	Lyn	"	4
John Buckrell	Beaconsfield	"	1
D. Duncan	Don	Jersey	3
A. Dunn	Ingersoll	Holstein	2
P. D. Ede	Oxford Centre	"	3
F. J. Griffin	Burgessville	"	4
M. L. Haley	Springford	"	4
Thos. Hartley	Downsview	"	8
R. F. Hicks	Newtonbrook	"	2
F. C. Pettit & Son	Burgessville	"	1
James Rettie	Norwich	"	3
Geo. Rice	Tilsonburg	"	15
M. Richardson	Caledonia	"	4
W. Rivers	Foldens	"	5
Wm. Slaght	Bealton	"	7

TESTING SAMPLES OF MILK AND CREAM.

Since my last report we have tested about 150 samples of milk and cream which have been sent in by various parties by means of mail and express. So far as our time will permit, we are pleased to make these tests to settle disputes at creameries, or to give persons who have no tester, an idea of the percentage of fat in their cream, or fat lost in skim-milk. We frequently receive samples without anything to indicate where or from whom they came. Sometimes we receive several samples at one time from different places, and nothing to indicate by whom the individual samples were shipped. It is impossible for us to report on such samples.

There are a few points requiring attention from the persons sending us samples to test:

1. It is important to send a *representative* sample of the milk or cream to be tested.
2. If a fat determination only is required, about two fluid ounces is sufficient, but the sample bottle must be filled to the top in order to prevent churning. If a specific gravity determination is also required then we need about one pint of milk.
3. The sample must be securely packed so as to prevent breaking during transit.
4. Mail or express charges must be prepaid.
5. All samples must be properly marked and the name and post office address of the shipper must be plainly shown.
6. Charges amounting to five cents per sample for fat determination and twenty-five cents per sample for "total solids" determination should accompany samples sent to be tested.

An Excellent Record.

Last year we reported the "good record" in November, 1906, for the Holstein cow, Boutsje Q. Pietertje De Kol, No. 6093, C.H.F., which dropped a calf on October 26th, 1906. We are very much pleased that this cow maintained her good performance throughout the year. Much credit for her remarkable record belongs to the herdsman, Mr. C. S. Wood. Although the cow was not in the charge of the Dairy department after January 1st, 1907, we take the liberty of requesting that her record for the full year period of lactation be published. We think it is the best year record of performance of any Canadian cow, and it is doubtful if any cow beginning her record before she was four years old, has done more creditably. We think this record of sufficient importance to justify its publication in detail by months, which is as follows:

Boutsje. Record for twelve months, Oct. 27th, 1906, to Oct. 26th, 1907, (inclusive).

Month.	No. of days Milking.	Lbs. Milk.	% fat.	Lbs. fat.	Value of fat.	Value of milk at 4 cts. per qt.	Cost of feed.
Oct. 1906	5	264	3.0	7.92	$1.59	$4.21	$1.40
Nov. "	30	2522	3.5	88.29	19.41	40.32	8.34
Dec. "	31	2352	3.7	87.02	22.62	37.60	7.98
Jan. 1907	31	2105	3.6	75.78	19.70	33.60	7.95
Feb. "	28	1770	4.1	72.57	20.31	28.32	7.00
March "	31	1994	3.8	73.87	20.68	31.09	7.83
April "	30	1755	4.3	75.46	18.86	28.08	7.58
May "	31	1720	4.0	68.80	17.20	27.52	7.83
June "	30	1701	3.8	64.64	12.93	27.20	2.75
July "	31	1437	3.6	51.73	10.34	22.96	3.11
Aug. "	31	1282	3.6	46.15	10.13	20.50	3.11
Sept. "	30	1051	3.8	39.93	9.17	16.80	4.10
Oct. "	26	875	3.4	29.75	7.44	14.00	3.68
	365	20,778	3.76	781.91	$190.38	$332.20	$72.66

Methods of Determining Moisture in Dairy Products.

Last year we discussed in detail a method of determining moisture in dairy products which we considered simple enough to use in creameries and cheeseries. This method consists of drying samples of butter, curd, or cheese in small tin "pattypans" in a steam oven attached to one of the steam pipes in the creamery or cheesery. The plan was fully described and illustrated in our last report.

We have been trying during the past year to simplify the method still further, and find that by having the tin dishes all the same weight and by weighing into the dishes exactly 2.5 grams of the product to be tested, it reduces the amount of weighing and mathematical work considerably. The plan followed was to select the heaviest dish among the lot we were using and bring all the others to the same weight by dropping common solder on the side of the dish until it was approximately the correct weight, which in this case was 30 grams. Then by the use of a file the solder was removed until each dish was exactly 30 grams in weight. The dishes need to be tested from time to time to see that they are correct. When weighing a sample, place the small dish on one pan of the scale and a 30-gram weight on the other; if these balance, then add 2.5 gram weights to the 30. Now put butter, curd, or cheese into the dish until the 32.5 gram weights are balanced. When all samples are taken according to directions as given in my report of last year, place in the steam oven and dry at a temperature of 100° to 105° C. for about five hours. Then weigh, place in the oven again for about one hour and weigh again. If the weight is constant, all the moisture has been evaporated. The difference between the original and second weight is the amount of moisture lost. This difference multiplied by 40 equals the percentage of moisture lost. For example, dish and sample weigh 32.5 grams at the beginning; when weighed the second time they weigh 31.67 grams. The difference is .83 grams; .83 × 40 = 33.2, which is the percentage of moisture in the sample. The reason that the factor 40 is used for multiplying the difference in weight is that 2.5 is one-fortieth of 100. The most convenient weight of butter, curd, cheese, etc., for a sample has been found to be 2.5 grams; as it is sufficient to be representative, it dries in a comparatively short time, and the factor 40 is a very convenient for finding the percentage of moisture in a sample.

A SHORT TEST FOR DETERMINING THE MOISTURE IN CURD AT DIPPING.

Last year we gave details of a very simple relative test for the amount of moisture in curds at dipping, or removal of the whey from the curd. Further experiments have been conducted during the past year. Briefly, the plan consists of packing a weighed measure with a given volume of curd. We use a 17.5 cc. measure for convenience. Then weigh the measure and curd. The difference between the weight of the measure and the weight of measure and curd is the weight of curd. As the moisture is removed from the curd, the weight of a given volume decreases. Last year we found that for each decrease in weight of .1 gram in a 17.5 cc. measure the percentage of moisture in the curd decreased about .6 of 1 per cent. During 1907 we found that curds which averaged 52.904 per cent. moisture at dipping averaged 18.309 grams, as the weight of 17.5 cc. curd. When similar curds were stirred so as to average 48.692 per cent. moisture at dipping, the average weight of 17.5 cc. of the curd was 17.487 grams—an average decrease in the curd of one-tenth of a gram in weight of 17.5 cc. This is approximately the same as last year. The difference between the results this year and last is probably accounted for by the difference between the specific gravity of the moisture-free curd. This varies from year to year. Some authorities claim that during a dry season the relative amount of casein in milk is considerably less than in a wet season, and that the yield of cheese is less from similar milk.

OTHER SHORT TESTS.

During the past year at least two other short moisture tests have been brought prominently before Canadian cheese and buttermakers. One of these was invented by C. E. Gray, of the Department of Agriculture, Dairy Division, Washington, U.S.A. Early in the year, E. H. Webster, Chief of the Dairy Division, Department of Agriculture, Washington, very kindly placed at our disposal two sets of the Gray apparatus for experimental purposes. We take this opportunity of thanking Chief Webster for his courtesy in this matter. Later in the season we purchased the "Improved Gray apparatus" from the Wagner Glass Works, New York, U.S.A.

The Gray method is given in detail in Circular No. 100 from the U. S. Department of Agriculture. Briefly, the method consists in boiling ten grams of butter in a suitable flask, to which has been added 6 cc. of "a mixture amyl-acetate 5 parts, and amyl-valerianate 1 part." After boiling for 5 to 8 minutes the amyl reagent and the moisture are driven into a graduated flask where the percentage of moisture is read. In the ordinary Gray apparatus the measuring flask must be disconnected, and the tube reversed before it can be read. The Wagner improvement consists of a modification, whereby the reading may be done without disconnecting or reversing, which is obviously an improvement so far as the practical operation of the test is concerned.

The other short method is variously known as the "Beaker method," "Richmond," "Patrick," and "Irish." So far as we have been able to look into the matter, the credit for discovering this method belongs to H. Droop Richmond, analyst to the Aylesbury Dairy Company, London, England. The method in its essentials was described in his book, "Dairy Chemistry," published in 1899, and was more fully described in his "Laboratory Book of Dairy Analysis," 1905.

Briefly, the method consists of heating 10 to 20 grams of butter, etc., in a beaker (aluminum preferred), directly over a gas flame or spirit lamp until foaming ceases and the substance has become somewhat brown in appearance, showing that the water has been evaporated. In our work we found ten grams of butter a convenient sized sample to use. The chief weakness of the test is in determining the "end-point," *i.e.*, the point when heating should cease. If heated to the point where the fat is charred, an excessive loss takes place and the percentage of moisture credited is too high. Otherwise, this is undoubtedly the simplest moisture test yet devised. It is quickly made, the results are fairly accurate, thère is no cost for chemicals, or glassware easily broken, and no great skill is needed, except for weighing accurately and in knowing when to cease heating.

During the past year we made between 40 and 50 comparative tests in duplicate of the four methods, viz., drying in steam oven, Gray, Gray-Wagner and Richmond short tests. We also made a few comparative tests of the Gray and Richmond methods on curd and cheese, but found these short tests unsatisfactory. The results with curd were altogether too low. It was also found a very difficult task to clean the beakers after heating curd or cheese in them directly over the flame. We abandoned both these short tests for determining the moisture in curd and cheese after a few trials.

The following table shows the comparative daily results of several tests of butter and also the average for the season for the three methods:

Date.	No. of samples tested.	Method of Determining Moisture.			Av. difference compared (with oven).	
		Steam oven Av. % Moist.	Gray Av. % Moist.	Richmond Av. % Moist.	Gray %	Richmond %
April 16	4	14.971	14.500	14.310	—.471	—.661
" 18	2	13.953	13.250	12.785	—.703	—1.168
" 20	3	13.933	13.283	13.891	—.650	—0.042
" 27	4	14.329	13.675	13.437	—.654	—.892
" 30	4	15.204	14.750	14.793	—.454	—.411
May 2	2	17.612	15.700	15.837	—1.912	—1.775
" 7	2	15.040	14.025	14.362	—1.015	—.678
" 14	2	14.939	14.200	14.300	—.739	—.639
" 16	2	16.099	15.287	15.350	—.812	—.749
" 21	3	13.966	12.633	12.933	—1.333	—1.033
" 23	2	15.800	14.151	14.137	—1.650	—1.663
" 28	3	13.466	12.783	12.916	—.683	—.550
" 30	2	14.350	12.625	13.287	—1.725	—1.063
Average of.......	35	14.874	13.912	14.026	—0.962	—0.848

The individual samples of butter in this table varied from 12 to over 19 per cent. moisture, which covers practically all the range there would likely be in ordinary work.

On June 27th and July 2nd six comparative tests were made, including the Wagner Improved Gray method. The results from two samples on June 27th were 14.1 per cent. moisture from the steam oven, 13.85 from the Gray-Wagner, and 15.1 from the Richmond beaker method. This was the only case where either of the short methods gave as high or higher results than did the steam oven. On July 2nd four comparative tests were made in duplicate of the four methods. The results were 15.15 per cent. moisture from the steam oven; 13.912 by the regular Gray; 12.875 by the Gray-Wagner; and 14.537 per cent. by the Richmond beaker method. In these tests of July 2nd the regular Gray method gave us results 1.238 lower, and the Gray-Wagner 2.275 lower than did the steam oven. While the Wagner improvement simplifies the operation of making a test with the Gray apparatus, the results were lower than those got from the regular Gray apparatus. As shown in the foregoing table, the regular Gray apparatus gave results averaging nearly one per cent. lower than did those from the steam oven. The Richmond method also gave lower results than were got by drying in a steam oven at a temperature of 100° to 105° C.

*We think the low results got from the Gray apparatus are due to some extent at least to loss of moisture during the heating process. In the Richmond test, as previously pointed out, the difficulty is to know when all the moisture has been driven off and when charring of the fat and other substances begin.

Conclusions.

1. The steam oven method of determining moisture in dairy products is simple and requires very little actual time to make a test. We understand that one of the American stations has adopted "a High Pressure Oven" method, in which results are got in from one to two hours. We can see no special advantage in this and the extra cost for such an oven, and the extra risk of bursting would probably counterbalance any advantages there may be in lessening the time required to dry the samples. All the other work would be the same for "a high-pressure oven" as for the simple one used by us. However, we hope to test the "high-pressure oven" during 1908.

2. None of the so-called short tests for determining moisture in dairy products has been altogether satisfactory. The one which comes nearest to a practical short test is the Richmond or Beaker method. We have not, however, found this suitable for curd or cheese. Further investigation may overcome the difficulties of this short test.

3. We would again strongly advise butter and cheese makers to become acquainted with the various methods now in use for the determination of moisture in dairy products. By so doing they will eliminate the risk of making butter which may be illegal (containing over 16 per cent. water) and in cheese work it will enable the maker to have more uniformity in the curd and cheese, thus adding to the pleasure and profit of dairying.

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*Since the foregoing was written, Prof. Gray has explained that some of the poor results got by using his moisture test are due to improperly made apparatus or to poor reagent. He says: "The first thing of importance is that the glassware should be correctly graduated. Another, the stopper which closes the end of the graduated tube must fit properly, also the rubber stopper which connects this graduated tube with the glass must fit properly. Another thing, the reagent must be made of pure compounds. If they contain impurities, the impurities are soluble in water and may take up water. Impurities may increase or decrease the apparent amount of water. If you have a space between the end of the rubber stopper fitting into the flask and the side of the flask, moisture will be lost."

EXPERIMENTS IN BUTTERMAKING.

Our experimental work in buttermaking during the past year has been along lines similar to those of last year, viz., (1) studying the effects of different methods of treating cream and butter, the latter to be exported to London, England, (2) the effects of different methods of manufacture on the moisture content and keeping quality of butter.

Up to the end of 1906 most of our raw material at the College Creamery for butter-making was supplied in the form of milk. Some cream was delivered during 1906, but this was practically all sweet when we received it.

During 1907 most of our delivery for buttermaking consisted of cream, some of which was delivered three times a week, but most of it only twice a week. The major portion of it was sour when we received it, and in some cases the cream was poor in flavor. These facts will explain some of the adverse criticisms made this year by the English firm who received our experimental shipments in 1906, and again in 1907.

The experimental shipments to London consisted of lots of butter made from cream raw or unpasteurized; lots from sweet and sour cream pasteurized, cooled and churned at once without culture; lots treated similarly to the foregoing except that ten to fifteen per cent. of culture was added to the cream just before churning; and lots made from cream which had been pasteurized and the cream afterwards ripened in the usual way. These six kinds of cream formed the basis of the main series in the experiments. In connection with the major series, there were four minor series of experiments to determine the effects of three different kinds of preservatives and the effect of common salt (sodium chloride) on the quality of butter. The preservatives were applied with and without salt in both dry and liquid form.

We arranged with Messrs. Hodgson Bros. & Rowson, of Montreal, to score the butter on arrival there, then to forward the various lots to London, Eng., where the firm of Rowson, Hodgson & Co., examined the butters, sold them and reported results. We are under obligations to these two firms for their interest in the work and for their patience and goodwill in sending us reports on the various lots.

The same general plan of conducting the experiments was followed in 1907 as in 1906. Details of methods used in making the butter will be found in my last report and need not be repeated here. We arranged with the Grand Trunk Railway to lift the butter weekly from our refrigerator and place it on board the refrigerator car for Montreal. In a few cases shipments were made once in two weeks.

The following correspondence with reference to the refrigerator car service at Guelph explains itself. I may add, that it would seem as if the railway clerks and hands had decided that after my first visit I should not have another opportunity to closely inspect the refrigerator cars. I may be mistaken, but it certainly looked as if there was some pre-arranged plan whereby observations in future would not be allowed. The first time I went to the freight shed, the clerks in the freight shed and the men on the train afforded me every facility for getting facts, but it was quite apparent on my second and third visits that a new order had gone forth. I am not prepared to say that this came from headquarters, but there was apparently a change of attitude on the part of those concerned. During a call from the Division Freight Agent, G.T.R., and the local agent, their attention was called to this point, but they denied that any such order or understanding existed and explained it on the ground of carelessness of employees. They also said that wrong information about trains was also due to the same cause. As they expressed it, "The men didn't know where the way freight was, they simply guessed at it." These officials admitted that perishable freight should receive first attention on arrival of freight trains at a station.

Guelph, Canada, Sep. 6th, 1907.

Secretary Railway Commission, Ottawa, Ont.

Dear Sir,—At the request of Dr. Mills, Railway Commissioner, I am enclosing notes taken on three different occasions,— July 20th, July 27th, and August 10th, of the present year,—regarding the G.T.R. refrigerator car service for butter at Guelph. I sent these facts to Mr. Loud, General Traffic Manager of the G.T.R., on Aug. 10th, and had a letter from him saying he would look into the matter, but have heard nothing further. I may say that the service was very similar last year.

I have also requested the two Creamery Instructors for Western Ontario, Messrs. MacRobertson, St. Mary's, and Fred Dean, Strathroy, to send me any reliable information on the subject of refrigerator cars for butter which they may observe in their travels visiting creameries. This information will be forwarded to you as soon as it is received by me.

Trusting that the enclosed facts may be of service in securing an improved refrigerator car service, I am,

Yours respectfully,

H. H. Dean.

Notes *re* Refrigerator Car Service, G.T.R., Guelph, Ont.

July 20th. Refrigerator Car No. 40086, pulled up at the freight shed platform, 10 a.m. Our butter had been in the freight shed at 78°F. since about 9 a.m., having been lifted from our refrigerator at the College about 8 a.m., same day. The temperature of the air outside at the freight shed was 82°F. The temperature in the ordinary box cars on the siding was 80° to 82°. The temperature of the refrigerator car was 72°F. in the West end, 74° near the middle, and 76°F. in the East end, where our butter was placed. As the West end of the car was nearly filled with butter which had been loaded at Baden, this probably accounts for the lower temperature in this end of the car. I got on top of the car while one of the train hands removed the covers from the ice boxes. I found three blocks of ice in each of three ice boxes and two in the other ice box. The total estimated weight of ice in the four ice boxes was between 500 and 600 lbs.

I also noted that owing to the manner in which the refrigerator car doors are constructed, these doors must be open when the car is shunted alongside the platform and they cannot be closed until the car is moved from the platform. On this day, the car was standing for about one-half hour with the hot sun shining directly into the car. The doors were still open and the engine was still shunting in the yard when I left about 10.30 a.m. The temperature in the car in the meantime had risen to 78°F.

July 27th. The "way freight" was reported as likely to arrive in Guelph about 10.15 a.m. At 11 a.m. I was told that she was at Petersburg and would not likely reach Guelph until between 12 and 1 o'clock. After taking observations on the temperature of the freight shed which was 72°F. where our butter was being held to await the arrival of the freight, I went to luncheon. About 12.45 I telephoned to see if the freight had yet arrived. She was reported as in, and likely to remain about 20 minutes. Before I could leave the Dairy, word was sent that the freight was "just pulling out," consequently I was unable to make any observations on the refrigerator car that day.

August 10th. "Way freight" reported as likely to arrive about 10.45 a.m. This train pulled into the Guelph freight yard about 11.45 a.m. Our butter had been taken from our refrigerator about 8 a.m., same day. Temperature of air in sun at Dairy at 10.25 a.m., 86°F.; in shade, 80°F. Temp. 11 a.m., in sun at freight shed 87°F. Temp. of air in freight shed near butter 84°F. By 11.50 a.m., the temperature in the sun at the freight shed had risen to 90°F. All this time our butter was in the hot freight shed, while the train hands were busy unloading iron, barrels, etc. from the cars. After asking several times when the refrigerator car would be shunted on the siding for our butter, so that I might make some observations, and after receiving no satisfaction as to when the car would be opened for the butter, I left the yards, as it seemed a waste of time to wait any longer. We discontinued the shipments after August 24th.

The reports which we have received from London, England, regarding the quality of our butter were not at all satisfactory. We had a number of complaints as to poor flavor, but more, that the butter was "greasy." We bored samples before leaving our refrigerator and almost without exception the lots appeared firm in body and texture. We are inclined to think that the "greasy" condition reported by the London firm was due largely to the high temperature at which the butter was carried during transportation. It may have been on the steamship, or after reaching London, but we know that at least a portion of the damage was done in the freight shed and on the car between Guelph and Montreal.

H. H. Dean,

Professor of Dairy Husbandry.

In a letter dated August, 12th, 1907, Freight Traffic Manager, Jno. W. Loud, Montreal, says, "Your complaint through Commissioner Mills in February last was referred to Mr. McGuigan, Fourth Vice-President, and I was in hopes that the service would after that time be quite satisfactory; from your letter, however, there is still room for improvement." Mr. W. G. Brownlee, General Transportation Manager, G.T.R., in a letter dated, Montreal, Sept. 30th, 1907, says, in explanation of matters referred to Mr. Loud, to whom I had written giving facts as stated in the correspondence with the Railway Commission: "The night foreman, who has charge of icing cars, states that there were fully two tons of ice in this car (No. 40086) when it left Stratford, and he thought that it would be sufficient to carry it through." "The information as to the time of arrival of way freight was given by——————who is not now in the service." The foregoing are extracts from a report furnished to Mr. Brownlee by U. E. Gillen, Superintendent at Toronto. From the foregoing it would seem as if the railways were trying to give a satisfactory service, but are largely at the mercy of employees who do not give the business that attention that it ought to receive. The only way to get an improvement in the service is to keep the matter before the railway managers and the public. The firm in Montreal to whom we were sending our butter say, in a letter dated Montreal, June 25th, 1907,—"Your butter arrived yesterday in a more heated condition than it should, and we are of your opinion, that the companies are not giving sufficient attention to the proper icing of cars. . . . . We have had several instances of supposed refrigerator cars, where the butter has actually been shipped without a particle of ice. . . . . We are doing all we can in this respect, but we have to take pretty much what is given us and look pleasant. . . . . As these refrigerator cars receive a bounty of five dollars each from the Government; they should be given proper attention."

One of the Creamery Instructors for the Province reports, "200 to 250 boxes of creamery butter and nearly as many tubs and boxes of dairy were delivered at a station in Western Ontario between 9 and 10 a.m.,and it was still on the station platform at a temperature of 70 degrees when I left at 5 p.m., the way-freight not having arrived."

It is evident from these facts that lack of ice in the cars and delays on account of the way-freight are quite common. As Freight Traffic Manager Loud says, "There is still room for improvement."

TABLE I.—SUMMARY OF THE CHIEF POINTS IN THE MANUFACTURE OF THE EXPERIMENTAL BUTTERS SHIPPED TO LONDON, ENG., 1907.

Group.	No. of experiments	Kind of Butter.	Av. % fat in cream.	Av. temp. cream at churning.	Average minutes churning.	Av. % fat in buttermilk.	Av. No. of revolutions of worker in working.	Av. No. of 56 lb. boxes in group.	Av. price sold for in London.
				F.					Shillings per cwt. (112 lbs.)
1	12	Unpasteurized cream delivered sour..	23.8	54.2°	33.3	.207	15.3	6	102.7
2	8	Pasteurized sour cream	22.5	55.5°	19.6	.650	16	6	102
3	5	Cream chiefly sour when delivered, pasteurized, cooled, culture added and churned at once..............	26.9	49.4°	40.4	.234	15.8	7	101.8
4	5	Cream pasteurized, sweet, cooled, culture added and churned at once	28.7	51.6°	19.4	.200	13.2	3	109.6
5	10	Cream pasteurized, sweet, cooled, and churned at once without culture...	30.9	49.°	21.	.237	14	4	106.4
6	5	Cream pasteurized sweet then ripened in usual way before churning......	24.8	54.4°	15.4	.398	15.4	5	103.6
		Average of all....................	26.2	52.3°	24.8	.321	14.9	5	104.3

COMMENTS ON FOREGOING TABLE.

1. Experiments made with the raw or unpasteurized cream delivered sour, were conducted between June 11th, and July 17th, hence did not have the benefit of the higher market price which prevailed for butter in some of the other groups. The percentage of fat in the cream at the time of churning varied in the different churnings from 18 to 26 and averaged 23.8, which was about 2½ per cent. less than the average percentage of fat contained in all the groups. The temperature for churning was about two degrees above the average, and the time required for churning was 8½ minutes more than the average. The percentage of fat in the buttermilk was about one tenth of a per cent. less than the average for all the groups. The butter was given about the average number of revolutions in the worker during the working process.

2. The lots in the second group were made from cream delivered sour, which was pasteurized in the afternoon of one day and churned the following morning without any culture (starter) having been added to the cream. These lots churned in less time than the average, and produced the greatest loss of fat in the buttermilk, viz., an average of 0.65 per cent. fat. The average price received for these was .7 of a shilling less, per 112 lbs., than for the previous group, and 2.3 shillings less than the average for all groups.

3. The third group consisted of lots made from cream delivered, partly sweet, but chiefly sour. The cream was heated to 180 degrees to 185 degrees F. then cooled to about 46 degrees F., ten per cent. of culture (starter) was added, and the cream was churned at once to an average temperature of 49.4 degrees F. The time required for churning was the longest in this group of any, averaging about 15½ minutes more than the average of all. The fat lost in the buttermilk was about normal, but the price was about the lowest of any of the groups. This was due to some extent to the fact that the butter was made and shipped during June and July when prices were lowest in London, Eng.

4. In group four, the aim was to have all the cream sweet when pasteur-

ized. The percentage of acid at the time of pasteurizing varied from .25 to .31 and averaged .262 for the group. These lots of cream were heated to 180 to 185 degrees F., then cooled to about 46 degrees F. by running the cream over the mechanical refrigeration cooler. The cream was conducted from the cooler directly into the churn, ten per cent. culture was added and the cream was churned at once. The average churning temperature was about two degrees higher than for the previous group and the average time required for churning was the second shortest of any of the groups, viz., 19.4 minutes. The percentage of fat in the buttermilk was normal,—.2 per cent. The average price was highest of any of the groups, viz., 109.6 shillings per hundred weight To some extent this is due to the butter arriving in London on a stronger market than was the case with some of the other groups. The butter was made between Aug. 12th and 16th.

5. The butter in group five was made between July 22nd, and Aug. 21st. There were ten experiments in this group. The cream was pasteurized sweet and churned at once, after cooling without any culture. The percentage of acid in the cream at the time of pasteurizing varied from .2 to .27 and averaged .225 for the group. The average price was 106.4 shillings per hundred weight.

6. Group six, made between June 20th and Aug. 8th, consisted of five experiments. The cream was pasteurized sweet, culture was added, the cream was ripened in a vat in the usual way and churned next morning. The time for churning was the shortest of any of the groups, averaging 15.4 minutes and the percentage of fat in the buttermilk was above the average, being practically .4 per cent. The average price obtained for the butter in this group was 103.6 shillings. Some of the lots, however, were delivered on a dull market which affected the average price adversely.

TABLE II.—SCORES OF BUTTER AS GIVEN IN MONTREAL AND PERCENTAGES MOISTURE, CURD, SALT AND PRICE SOLD FOR.

Kind of Butter.	Date of making.	Serial No.	Flavor, 50.	Grain, 20.	Color, 15.	Salt, 10.	Package, 5.	Total, 100.	Per cent. moisture.	Per cent. salt.	Per cent. curd.	Price sold in London. s.
Unpasteurized cream delivered sour.	June 11	2	48	18	13	10	5	94	......	....	....	97
½ oz. salt, ¼ per cent. borax in butter.	" 12	3	48	20	15	10	5	98	14.09	1.60	.765	94
	" 18	6	48	18	14	10	5	95	15.20	2.63	.599	98
Group 1.	" 28	11	46	18	15	10	5	94	13.63	1.73	.570	102
	July 3	15	47	19	15	10	5	96	12.67	1.94	.530	100
	" 5	16	48	18	13	10	5	94	14.94	2.90	.699	104
	" 10	20	48	18	13	10	5	94	15.04	2.12	.500	102
	" 12	21	40	16	13	10	5	84	15.90	2.62	.543	106
	" 17	25	45	18	13	10	5	91	16.40	2.00	.535	104
Average 9 expts.	....	....	46.4	18.1	13.7	10	5	93.3	14.73	2.19	.592	100.8
Pasteurized sour cream.....	June 21	8	48	20	15	10	5	98	17.02	1.73	.590	100
	" 26	9	47	20	15	10	5	97	14.79	2.19	.460	100
½ oz. salt and ¼ per cent. borax in butter.	" 29	12	46	18	14	10	5	93	12.28	1.82	.500	102
	July 2	14	48	20	13	10	5	96	12.00	2.56	.550	100
	" 6	18	44	18	13	10	5	90	14.80	2.50	.524	102
Group 2.	" 9	19	44	18	13	10	5	90	15.90	2.50	.511	102
	" 16	24	42	16	13	10	5	86	14.50	2.25	.419	104
Average 7 expts	....	....	45.5	18.5	13.7	10	5	92.8	14.47	2.22	.508	101.4

TABLE II.—SCORES OF BUTTER—*Continued.*

	Kind of Butter.	Date of making.	Serial No.	Flavor, 50.	Grain, 20.	Color, 15.	Salt, 10.	Package, 5.	Total, 100.	Per cent. moisture.	Per cent. salt.	Per cent. curd.	Price sold in London. s.
	Unpasteurized cream delivered sour. ¼ per cent. borax in butter..	July 24	28	48	18	15	10	5	96	14.90	....	.570	108
		" 31	31	46	18	15	10	5	94	15.00	....	.570	110
		Aug. 7	34	47	17	15	10	5	94	14.70	....	.570	108
	Group 3.												
	Average 3 expts	....	....	47	17.6	15	10	5	94.6	14.86	....	.570	108.6
	Pasteurized sour cream, ¼ per cent. borax in butter..	July 23	27	48	18	15	10	5	96	15.60	....	.51	196
	Group 4.												
Cream chiefly sour, pasteurized and cooled, culture added and churned at once.	Washed in brine	June 10	1	48	20	15	10	5	98	......	....	....	102
	½ oz. salt,......	" 12	4	47	20	15	10	5	97	15.33	2.10	.660	100
	½ oz. salt, ¼ p. c. borax	" 17	5	45	20	14	10	5	94	14.61	2.10	.490	98
	½ oz. salt, ¼ p. c. K. P.........	July 12	22	45	20	13	10	5	93	16.05	1.75	.419	105
	½ oz. salt, ¼ p. c. A. P.........	" 15	23	42	19	12	10	5	88	14.97	2.12	.598	104
	Group 5.												
	Average 5 expts........	....	....	45.4	19.8	13.8	10	5	94	15.26	2.02	542	101.8
Pasteur. sweet cream, and culture added before churning.	Washed in brine and borax.....	Aug. 12	36	47	20	14	10	5	96	13.50	0.25	.560	110
	Salt ½ oz.........	" 14	37	44	18	13	10	5	90	14.30	1.65	.520	108
	Same churning. ¼ % borax	" 16	38	46	20	15	10	5	96	14.20	....	.490	110
	¼ % K. P.	" 16	39	46	20	15	10	5	96	14.10	....	.580	110
	¼ % A. P.	" 16	40	47	20	15	10	5	97	13.90	....	.660	110
	Group 6.												
	Average 5 expts........	....	....	46	19.6	14.4	10	5	95	14.00	.95	.562	109.6
Cream past., sweet, cooled & churned without culture.	Washed in brine.	July 22	26	46	20	15	10	5	96	13.6	0.63	.450	104
	½ oz. salt	" 24	29	48	19	13	10	5	95	14.4	1.50	.390	100
	½ oz. salt, ¼ % B..	" 29	30	47	20	13	10	5	95	13.3	1.90	.640	104
	½ oz. salt, ¼ % K.P	" 31	32	45	18	13	10	5	91	13.8	1.30	.430	104
	½ oz. salt, ¼ % A.P	Aug. 5	33	46	17	12	10	5	90	13.8	1.80	.400	104
	Group 7.												
	Average 5 expts.	....	....	46.4	18.8	13.2	10	5	93.4	13.78	1.42	.462	103.2
Past. sweet cream without culture.	Washed B. and B..	Aug. 19	41	43	17	15	10	5	90	14.80	0.20	.63	110
	Same churning. ¼ % borax ...	" 21	42	47	18	15	10	5	95	14.10	....	.57	110
	¼ % K. P.....	" 21	43	47	18	15	10	5	95	14.40	....	.61	110
	¼ % A. P.....	" 21	44	47	20	15	10	5	97	14.30	....	.45	110
	½ oz. salt	" 21	45	45	18	13	10	5	91	13.10	1.25	.58	108
	Group 8.												
	Average 5 expts........	....	....	45.8	18.2	14.6	10	5	93.6	14.14	.62	.568	109.6

TABLE II.—SCORES OF BUTTER—*Concluded.*

	Kind of Butter.	Date of making.	Serial No.	Flavor, 50.	Grain, 20.	Color, 15.	Salt, 10.	Package, 5.	Total, 100.	Per cent. moisture.	Per cent. salt.	Per cent. curd.	Price sold in London.
													s.
Pasteurized cream ripened in usual way.	Washed brine	June 20	7	49	18	15	10	5	97	14.46	0.37	.530	102
	½ oz. salt	" 27	10	45	19	12	10	5	91	13.08	1.81	.500	102
	½ oz. salt, ¼ % B. . . .	July 2	13	49	20	14	10	5	98	11.19	2.31	.540	102
	½ oz. salt, ¼ % K.P. .	" 6	17	49	19	14	10	5	97	15.30	2.49	.657	106
	½ oz. salt, ¼ % A.P. .	Aug. 8	35	45	15	13	10	5	88	14.80	1.10	.570	106
	Group 9.												
	Average 5 expts.	. . . .	. . . .	47.4	18.2	13.6	10	5	94.2	13.76	1.61	.559	103.6

COMMENTS ON TABLE SHOWING SCORES OF BUTTER, MOISTURE, ETC.

The lots of butter made for the various experimental shipments to London, England, during the past season have been grouped in the foregoing table, into nine groups according to the character of the cream from which the butter was made, and nature of preservative used. A third grouping is made according to the nature of the preservatives used in the butter. It will be convenient to comment on the results in the table according to groups.

1. There were nine lots of butter in the first group made from cream delivered sour during the afternoon of one day and churned without pasteurizing the following morning. The lots were treated with one-half ounce of salt per pound of butter and one-quarter of one per cent. common borax. The butter was made between June 11th and July 17th. The average score for flavor as given in Montreal was 46.4 points out of a possible 50. The grain averaged 18.1 out of a possible 20, and 13.7 out of a possible 15 for color. The average total score was 93.3 out of a possible 100. The average percentages of moisture, salt and curd were respectively 14.73, 2.19 and .592. The prices at which these lots sold in London, Eng., ranged from 94 to 106 shillings per long hundredweight, and averaged 100.8 shillings per cwt. for the group. This is the lowest average selling price for any of the groups but to some extent this is accounted for by the fact that the butter reached London during more or less dulness on the market there. No. 1 in group 5, which was saltless and made from sweet cream the previous day and sent in the same shipment as lot 2, sold for 102 shillings, whereas No. 2 in group 1, which was salt butter, sold for 94 shillings. The flavor of No. 2 was reported as being "not nearly so good as No. 1." This and several other lots were reported as being "greasy." We cannot understand the cause of this "greasy" condition of the butter on so many lots, unless they were overheated during transit.

We examined all the lots before leaving our refrigerator, and they "ironed" all right. In one of their letters the London firm says:—"All the butters which you sent last season ironed beautifully, and showed just a nice amount of grain, whilst retaining smoothness without a suspicion of oiliness.'' Methods of manufacture were practically the same in 1907 as in 1906, except that our raw material was mostly cream in 1907 and chiefly milk in 1906.

2. Group 2 consists of seven experiments made between June 21st, and July 16th. The butter was made from cream delivered sour, which was pasteurized one afternoon and churned the following morning. Salt and borax were added to the butter, same as for Group 1. The average Montreal score for flavor was 45.5 out of a possible 50 and 92.8 for the total, out of a possible 100. The average percentages of moisture, salt and curd were similar to those in Group 1. The average selling price in London was 101.4 shillings.

3. This group consists of but three experiments made July 24th, 31st and Aug. 7th. The cream was delivered sour and butter was made without pasteurizing. There was added one-quarter of one per cent. borax, but no salt. Average Montreal score for flavor, 47 and a total score of 94.6. Average selling price, 108.6 shillings, which is the third highest price obtained for any of the nine groups. However, there were not a sufficient number of experiments in this group to test the matter fully.

4. The next group contains but one experiment. This was made from pasteurized sour cream, which was churned after standing over night. To the butter was added one-quarter of one per cent. of borax. The score for flavor was 48, with a total score of 96. Moisture in butter 15.6 per cent., curd .51. Price sold, 106 shillings. The London report on this lot was unfavorable, although the price was good. In one of their letters the London firm says: "Kindly remember that when criticising O.A.C. butters we are looking for the excellent quality and texture which these butters showed last year. They are still good butters, or we should not have been able to make the prices we have for them, but they fall below last year's standard.''

5. Five experiments with pasteurized sweet cream to which culture was added and churning done at once, make up this group. One lot of butter was washed in brine and the others are made up of one experiment each, having ½ oz. salt, ½ oz. salt and ¼% borax, ½ oz. salt and ¼% English preservative (K.P.) and ½ oz. salt and ¼% Canadian preservative (A.P.) The average score for flavor was 54.4, total score 94. Selling price 101.8 shillings. The butter was made between June 10th and July 15th. "These had a slightly peculiar flavor and the aroma not so good as lot 21.'' (Lot 21 was made from unpasteurized cream and shipped at same time as lots 22 and 23 to which foregoing comment from London refers.)

6. Group 6 consisted of five experiments made between Aug. 12th and 16th. These lots were also made from pasteurized sweet cream to which culture was added before churning. They were all shipped at the same time from Guelph (Aug. 24th.) One lot was washed in brine and borax water, one had ½ oz. salt added (No. 37) and the remaining three lots were taken from the same churning. All the lots of saltless butter sold for 110 shillings, while the one lot of salt butter sold for 108—two shillings less than saltless. The London comments on these lots are: "The shipment *ex* "Iona'' is a distinct improvement on any we have had this season, and all the butters (with the exception of one box, No. 45, which showed the peculiar flavor observed in other shipments, though not quite so pronounced) were very fine in quality, and almost all of them were very fine in texture. . . . . . With the exception of one lot, No. 37, the aroma is still poor, but we suppose we cannot expect from Canadian butters, at least three weeks old, as good an aroma as we get from Danish or Irish, which are only three or four days old, when they reach this market.''

Group 7 was treated similarly to Group 5, except that the cream was mostly sweet at the time of pasteurizing and had no culture added before churning. The average selling price was 103.2 shillings. London comments unfavorable.

8. This group was treated similarly to the previous group except that one lot was washed in brine and borax water, and four lots were from the same churning, three of which were treated with different preservatives and one with a half ounce of salt per pound of butter. They were shipped from Guelph at the same time as the lots in Group 6 (Aug. 24th.) It is interesting to note that lot No. 41, scored 43 for flavor in Montreal, lot No. 45, scored 45 and the others 47. The total scores in Montreal were 90, 95, 95, 97 and 91. The lot scoring 90 in Montreal sold for 110 shillings per hundredweight in London. The lot scoring 91, sold for 108 and the others for 110 shillings per long hundredweight. The lots in this group and those in Group 6 averaged the highest prices on London market, viz., 109.6 shillings. To some extent this was due to the butter reaching London on a favorable market.

9. Group 9 consisted of lots made from cream pasteurized, then ripened over night in the usual way with a culture or "starter" added. These lots were made between June 20th and Aug. 8th. One lot was washed in brine, one had ½ oz. salt added and the others were treated with salt and three different kinds of preservatives—Borax, K.P., and A.P. These lots averaged the highest score for flavor in Montreal, except Group 4, which contains but one experiment. The average selling price was 103.6 shillings due to some extent to a dull market on reaching London. Comments from London firm on these lots are: "Flavor good," "Flavor fair." "These were very fine in quality and the best lots as regards texture." "Flavor very clean, aroma poor."

TABLE III. SHOWS AVERAGE SCORES OF SALT AND PRESERVATIVE LOTS OF BUTTER AS GIVEN IN MONTREAL, ALSO AVERAGE PER CENT. MOISTURE IN BUTTER, AND PRICE SOLD IN LONDON.

Kind of Butter.	Flavor 50.	Grain 20.	Color 15.	Total 100.	% Moisture.	Price in shillings per cwt. (112 lbs.)
Common salt, ½ oz.	45.80	18.80	13.20	92.80	14.022	103.60
¼ % borax........	46.88	18.34	14.74	94.98	14.698	107.08
½ oz. salt and ¼ % borax	46.62	19.62	13.67	94.95	13.392	101.35
½ oz. and ¼ % K.P.	46.33	19.00	13.33	93.66	15.050	105.00
½ oz. and ¼ % A.P.	44.33	17.00	12.33	88.66	14.523	104.60
¼ % K.P..........	46.00	18.60	14.30	94.00	14.100	108.00
¼ % A.P.	46.66	19.00	14.00	94.60	14.160	104.60
Salt brine	47.66	19.30	15.00	97.00	14.030	102.60
Brine and borax .	45.00	18.50	14.50	93.00	14.050	110.00
Average of all..	46.142	18.684	13.896	93.738	14.225	105.20

COMMENTS ON FOREGOING TABLE.

1. The highest average score for flavor as given by Hodgson Bros. & Rowson of Montreal, was for the lots washed in salt brine. This score (47.66) was 1.5 points above the average score in flavor in all the lots and nearly one point higher than the average for any other group. The next highest average score for flavor was for the lots of butter treated with one-quarter per

cent. of common borax. The lowest average scores for flavor were given to the lots treated with a Canadian preservative (A.P.) and the next lowest were lots washed in brine and borax water. The lots treated with common salt were third lowest in flavor.

2. The lots treated with one half ounce of common salt and one-quarter of one per cent. borax received the highest average score for "grain." This score was about one point above the average for all the groups.

3. In color, the lots washed in salt brine stand first, being a little over one point above the average.

4. The salt brine group also stands first in average total score, making a total of 97 out of 100, which is over three points above the average for all the groups.

5. The English preservative (K.P.) group, contains the highest percentage of moisture, being about three-quarters of a per cent. above the average for all the groups. The extreme variation in moisture in all the groups is less than two per cent.

6. The brine and borax group brought the highest average price in London, viz., 110 shillings. This is accounted for to some extent by the fact that these lots struck a more favorable market. The average price obtained for all the groups was about 105 shillings per long hundredweight.

FINANCIAL RETURNS.

As explained last year, the main object of the experiments was not the money profits, though this is an important factor from a business viewpoint. We give the financial data for the various shipments and also prices at which our butter sold locally for the sake of comparison.

It will be borne in mind that there were extra charges against these small lots which would not occur in the case of sending forward larger shipments.

TABLE IV.

Date of shipment from Guelph.	No. 56 lb. boxes in shipment.	Weight of butter.	No. of experiments in shipment.	Price at which butter sold in London per 112 lbs.	Net value of shipment.	Net value per lb. butter.	Price per lb. butter on local markets.
		Lbs.		Shillings.	$ c.	c.	c.
June 15........	23	1,288	4	94 to 102	237 50	18.5	22
" 22........	26	1,456	4	98 to 102	269 14	18.5	22
July 6........	40	2,240	6	100 to 102	421 60	18.5	22
" 13........	32	1,792	5	102 to 106	346 25	19.3	22
" 20........	32	1,792	5	104 to 106	341 05	19.0	22
" 27........	23	1,288	4	100 to 108	251 52	19.5	22
Aug. 10........	32	1,792	6	104 to 110	353 70	19.7	23
" 24........	22	1,232	10	108 to 110	253 45	20.6	24

Conclusions.

1. According to the results obtained in these experiments the advisability of pasteurizing sour cream for export butter would appear doubtful. The loss of fat in the buttermilk by churning pasteurized sour cream was excessive. The average score for flavor was within one-tenth of a point of the lowest average score of any of the groups in flavor. This pasteurized sour cream group was lowest in average total score. The average selling

price in London was second lowest of any of the groups. These remarks apply to pasteurized sour cream churned the day after pasteurization and also to those lots pasteurized sour, and churned at once with and without culture added to the cream before churning. There are a few exceptions to the foregoing general conclusions, notably the lots made June 21st and 26th, July 2nd and 3rd, from pasteurized sour cream.

2. The lots made from cream, partly sweet and partly sour when pasteurized, ripened in the usual way and churned the following day, received the highest average score for flavor in Montreal, but the average total score was less than for the lots made from sweet cream, pasteurized, cooled, and having culture added before being churned at once after cooling. These results agree with those obtained last year.

3. The lots made from cream delivered sour and churned the following day without pasteurizing and having one-quarter of one per cent. borax added to the butter, stand third in average score for flavor and second in average total score. This group also stands third in average price received in London, being but one shilling less per long hundredweight than the average price of the two highest groups, which sold for 109.6 shillings. It would seem from these experiments, though others are needed to confirm the results, that butter made from cream of good flavor delivered sour and having no salt added is nearly equal in quality to the lots made from pasteurized sweet cream. This is somewhat different from our previous experience and we shall require further data before arriving at definite conclusions on the point.

4. Saltless butter appears to suit the London market better than salted butter. In Group 8, table 2, are four lots (Nos. 42, 43, 44 and 45) out of the same churning. No. 45 was salted at the rate of one-half ounce per pound of butter. It scored 45 points for flavor in Montreal and sold for 108 shillings in London. The other lots from the same churning scored 47 for flavor in Montreal and sold for 110 shillings in London. The London firm estimated saltless butter to be worth about two shillings per long hundredweight (112 lbs.) more than salt butter for London, Eng.

5. The results with three different kinds of preservatives, combined with, and without salt, and applied in dry and liquid form to the butter, were similar to those got last year, viz., there was not much difference between the quality of the butter in which common borax was used at the rate of one-quarter of one per cent., and butter having the more expensive commercial preservatives. In the case of the Canadian preservative (A.P.) combined with salt, the Montreal scores were decidedly lower than for any of the other groups. This *might* be due to a combination of other circumstances as we find these lots selling for within six-tenths of a shilling of the average price received in London for all the lots, and above the average price obtained for three other groups. The lots made by washing the butter in a solution of salt (brine) and borax sold for the highest average price in London, although the average Montreal score on these lots is third lowest of any. We also have the peculiar combination of the lots averaging the highest total score in Montreal, selling for the second lowest average price in London. It would seem to be difficult to secure an agreement between scores and price. To some extent this is due to fluctuations in the butter market.

6. Two lots of butter, out of the 44 lots analysed, contained over sixteen per cent. moisture, but the majority averaged between fourteen and fifteen per cent. With ordinary methods of making butter there would appear to be little danger of exceeding the 16 per cent. moisture limit set by Canadian and British statutes.

7. As in 1906, the financial returns from butter shipped to London, Eng., were not equal to those obtained for similar butter on local markets. During the past two seasons Canadian markets have been better than those of Great Britain, and it is possible that in our rapidly developing country we shall be able in the near future to consume all the butter we can produce—in fact we may have to import butter to supply our own needs.

(Since the foregoing was written, considerable butter has been imported from England for local markets in Canada.)

Effect of Different Methods of Increasing the Moisture Content of Butter, Compared with the Moisture Content in Regular Make.

This is a continuation of the work done on this question during two previous years, 1905 and 1906. In 1907 the methods followed may be conveniently grouped under ten different headings—regular method with wash water at a temperature above 60° F., and the same with temperature of wash water below 60° F.; overchurning in buttermilk with temperature of the wash water above 60° and below 60°; butter washed with rollers of worker in motion, temperature of wash water above 60° and below 60°; butter overchurned in wash water at a temperature above and below 60°; butter overchurned in a solution of common salt (brine); and ordinary or regular method.

The experiments were made during the months of April and May. There were 42 different churnings made with these different methods. In addition, ten churnings were made to see if a uniform, fairly high moisture content could be made in butter, in successive churnings on the same day out of the same vat of cream, and also on consecutive days by following the same method. Altogether 52 experiments were made on the moisture question.

Most of the churnings were made for these experiments in a "Simplex" combined churn. A few were made in a "Success" combined churn. The main points of the experiments are brought out in the table, which gives the average results of a number of churnings in each group. The "overrun" is calculated on the pounds of fat in the cream vat, and not on the fat in the milk or cream delivered by the patrons.

Comments on Table V.

1. When following regular methods of buttermaking, except in the temperature of the wash water, the percentage of moisture in the butter varied from 13.8 to 14.597, while the "overrun" varied from 17.69 to 20.85, where the wash water was put on the butter at 62° F. In those experiments where the temperature of the wash water was applied to the butter at an average of 55°, the overrun was 16.62 per cent. and the moisture content of the butter was 13.919 per cent. The average percentage of moisture in the butter was practically the same for both groups, but the average overrun was over 2 per cent. greater for the lots washed with water above 60° F.

2. In those experiments where the butter was churned to lumps in the buttermilk and afterwards washed in water at a temperature above 60° F. the average percentage moisture content of the butter and per cent. of overrun were respectively 13.604 and 19.13. Lots treated similarly, except that the wash water was below 60° in temperature, averaged 14.536 and 17.72 per cent. for moisture content and overrun, respectively. Again we have a high overrun associated with a comparatively low percentage of moisture.

TABLE V.—SHOWING EFFECTS OF METHODS OF CHURNING ON MOISTURE CONTENT OF BUTTER.

Method of Churning.		No. of experiments.	Average lbs. cream churned	Average % fat in cream.	Average temp. of cream at churning.	Average min. churning.	Average temp. of buttermilk.	Average % fat in buttermilk.	Average temp. wash water.		Average No. of revolutions of worker.	Average lbs. fat in each churning.	Average lbs. butter in each churning.	Average % over-run.	Average % moisture in butter.
									On.	Off.					
Regular	Wash water above 60°......	5	254.6	25.7	55° F.	25.8	56.8° F.	.126	62° F.	61° F.	13.2	65.46	77.75	18.83	14.109
	Wash water below 60°......	9	495.8	25.6	54.6°	21.6	56.6°	.161	55°	55.6°	14.0	128.85	150.72	16.62	13.919
	Average of both....	14	409.7	25.66	54.7°	23.1	56.7°	.148	57.5°	57.5°	13.7	106.21	124.66	17.41	13.987
Overchurning in buttermilk	Wash water above 60°......	3	260	25.6	54.6°	32	57.3°	.106	62°	61°	13.3	66.73	79.50	19.13	13.604
	Wash water below 60°......	5	481.6	25.6	55.4°	25.4	57.6°	.136	56°	56.6°	14	125.29	144.25	17.72	14.536
	Average of both....	8	398.5	25.6	55.1°	27.8	57.5°	.125	58.2°	58.2°	13.75	103.33	122.47	18.25	14.187
Washed with rollers in motion	Wash water above 60°......	3	261	25.6	55°	27	57°	.106	62°	61°	13.3	66.73	81.25	21.76	16.039
	Wash water below 60°......	3	267.6	25	56.6°	22	58.3°	.156	56°	57.6°	14	66.98	80.33	20.15	16.258
	Average of both ...	6	263.8	25.3	55.8°	24.5	57.6°	.131	59°	59.1°	13.6	66.85	80.79	20.96	16.148
Overchurning in wash water	Wash water above 60°......	3	245	25.8°	55.6°	20.6	57.3°	.12	62°	61°	13.3	63.34	76.58	21.07	15.004
	Wash water below 60°......	15	369.75	26.32	54°	22.15	55.8°	.229	53.4°	55°	14.25	97.14	115.86	18.72	15.016
	Average of both....	18	307.37	26.06	54.8°	21.375	56.55°	.174	57.7°	58°	13.77	80.24	96.22	19.895	15.010
Overchurning in brine....		3	267.66	25.41	53.6°	20.3	55.3°	.150	57.3°	57.6°	12.3	67.86	83.83	23.49	17.864
Regular—cream same as preceding group		3	267.66	25.41	53.6°	22.3	55.6°	.15	57.3°	57.3°	13.6	67.86	80.00	17.83	14.477

3. Washing with rollers in motion produced a comparatively high overrun and butter with high mosture content. There was not much dfference in the results by washing butter in water above or below 60° F., what difference there is being in favor of a higher overrun at the warmer temperature, but the average moisture content of the butter is slightly lower than for the lots washed in water below 60°.

4. The results of churning the butter into lumps in the wash water were to produce a high overrun (21.07 per cent.) when the water was at an average of 62° as applied to the butter, but the average moisture content of three lots of this butter was 15.004, while five lots treated similarly averaged 15.772 per cent. moisture in the butter and 19.78 per cent. overrun. The average of fifteen experiments was 15.016 per cent. moisture in the butter and 18.72 per cent. overrun. In these groups also, we do not find an agreement between overrun and moisture content of the butter.

5. On April 25th and May 2nd and 16th, the cream on hand was divided each day into two lots. One lot of butter was overchurned in brine and the other was treated according to our regular methods of churning. The brine was made by dissolving common salt in water. In two of the experiments 30 lbs. of salt (10 lbs. for first and 20 lbs. for second washing) was added to the wash water for each churning, then the butter was given about ten revolutions for the first washing and 550 revolutions for the second washing in the churn. This method produced the greatest overrun of any method tried, viz., 23.49 per cent., and the butter contained the highest average percentage of water, viz., 17.864 for the three lots. The individual lots varied from 15.8 to 19.649 per cent. water.

The object of the foregoing experiments was to see how much water could be incorporated with the butter. The method is not recommended, as it produced butter containing more than the legal standard of moisture.

The lots treated in the ordinary way ranged from 13.8 to 15.576 per cent. moisture in the butter, while the overrun varied from 16.78 to 19.67 per cent.

Experiments to Ascertain if Uniform Moisture Content of Butter is Practicable by Following One Method.

In the forty-two churnings, made previously, the percentage of moisture in the butter from individual churnings varied from 12.752 to 19.649. Twenty-four churnings were between 13 and 15 per cent.; one was below 13, eight were over 15 and under 16 per cent., and nine lots of butter contained over 16 per cent. moisture. In ten churnings where one method was followed, viz., churning in the wash water which was at an average temperature of 52° F., when applied to the butter and 53.4° when drawn from the butter, the range in the percentage of moisture in the butter was from 13.2 to 16.4, while the average of the ten churnings was 14.26 per cent. of water in the butter. This range of 3.2 per cent. is rather more than is allowed by some authorities, who claim that butter ought not to vary more than one per cent. moisture in daily churnings. In this series of experiments (10 churnings) eight churnings were within the range of 13 to 15 per cent. moisture in the butter, which would seem to be fairly good work, though it may be possible to get within the one per cent. limit of variation.

Influence of Kind of Churn on per cent. Moisture in Butter.

In each of three groups we have churnings made with the small "Simplex" combined churn and also with the "Success," a similar make of churn, but one with a larger capacity. These churnings were made on dates close together and with similar cream. The results are as follows:

Churn.	Per cent. Moisture in Butter.	Per cent. Moisture in Butter.	Per cent. Moisture in Butter.
Simplex	14.052	14.292	15.772
Success	13.788	14.904	15.821

The average of ten "Simplex" churnings was 14.705 per cent. moisture in the butter, and for six "Success" churnings the average moisture content of the butter was 14.837, or practically the same. So far as these results go they indicate very litle difference in the moisture content of the butter made in these two styles of churns.

INFLUENCE OF PER CENT. FAT IN CREAM ON MOISTURE CONTENT OF BUTTER.

In the fifty-two churnings the percentage of fat in the cream churned varied from 23.5 to 29. There were nine churnings in which the percentage of fat in the cream was below 25. There were forty-three churnings where the percentage of fat in the cream was 25 per cent. and above. The average percentage of moisture in the butter from the nine churnings where the fat in the cream at the time of churning was below 25 per cent., was 15.22. The average percentage of moisture in the butter of the other 43 churnings was 14.748, or about one-half per cent. less than from the thinner cream. Further experiments are needed before drawing definite conclusions, but the foregoing results do not seem to indicate any marked effect of the percentage of fat in the cream at the time of churning, on the percentage of moisture in the butter.

EFFECT OF SIZE OF CHURNING ON PER CENT. MOISTURE IN BUTTER.

In the group where the regular method of churning was followed and the butter was washed in water at a temperature averaging 55°, there were five churnings with the small "Simplex" churn where the size of each churning averaged 77.1 lbs. The average percentage of moisture in the butter from these was 13.992. In the same group were four churnings with the "Success" churn which averaged 242.75 lbs. butter each. The average percentage of moisture in the butter from these four churnings was 13.751.

In the group where overchurning in the buttermilk was done and the butter afterwards washed in water at 56°, there were three churnings (Simplex) which averaged 78.41 lbs. butter each. The moisture content of the butter was 14.292 per cent. In two churnings (Success) of the same group where the size of each churning averaged 258 lbs., the butter contained an average of 14.904 per cent.

In the group where overchurning in the wash water below 60° was followed, were three churnings (Simplex) averaging 79.91 lbs. butter each. The butter contained 15.772 per cent. water. Two churnings (Success) in the same group averaging 242.5 lbs. butter each, averaged 15.821 per cent. moisture in the butter.

In three different methods of churning we have the small churnings averaging the highest moisture content in the butter once, the larger churnings the highest once, and in one group they are practically the same for the larger and small churnings. So far as these experiments go, they seem to indicate that size of churning does not have a constant effect on the moisture content of the butter. Further experiments are needed before stating definite conclusions.

QUALITY OF THE BUTTER IN MOISTURE EXPERIMENTS.

All the samples of butter were judged three times—once when about one week old, once when about a month old, and for a third time from two to four months after being made. All samples scored were pound prints wrapped in parchment butter paper, which prints were kept in our ice cold storage at a temperature of about 40° F. No special precautions were taken to preserve the samples other than keeping them in the cold storage. The scale of points used was: Flavor, 50; grain, 20; color, 15; salt, 10; package, 5; total, 100. Except in a few cases of the lots being gritty, all the samples were given full score for salt and package, hence, these need not be considered in the scoring results. We shall give the average of all individual scores in each group and also the average of first, second and third scores for flavor in order to show the deterioration through age. All samples were scored by number and the method of manufacture was not known to the judge at the time of scoring.

TABLE SHOWING QUALITY OF BUTTER BY DIFFERENT METHOHS OF MANUFACTURE IN ORDER TO INCREASE MOISTURE IN BUTTER.

Method of Making Butter.	Av. Flavor 50			Av. of All.	Av. Grain 20	Av. Color 15	Remarks.
	1st.	2nd.	3rd.				
Regular, Wash Water above 60° F.	46.6	42.4	41.	43.2	19.9	14.3	Granules size of wheat, peas and corn when buttermilk drawn. Butter given about 150 revolutions of churn in wash water.
Regular, Wash Water below 60° F.	45.6	42.	41.6	43.1	19.8	14.2	Butter granules size of wheat, peas and corn. About 150 rev. in wash water.
Average of both.......	46.1	42.2	41.3	43.15	19.85	14.25	
Overchurning in Buttermilk—							
W. Water above 60°..	47.	42.3	40.6	43.3	19.9	14.16	Butter churned to size of hickory and butter nuts in buttermilk.
" " below 60°..	45.6	42.	41.2	42.6	19.7	13.8	
Av. of both...........	46.3	42.15	40.9	42.95	19.8	13.98	
Washed with rollers in motion—							
W. Water above 60°..	47.	43.3	40.6	43.3	19.77	14.	Butter given about 65 revolutions of churn with rollers in motion. One lot of butter "gritty".
" " below 60°..	46.3	41.3	41.3	43.	19.66	13.3	
Av. of both...........	46.65	42.15	40.95	43.15	19.71	13.65	
Overchurning in wash water—							
W. Water above 60°..	47.	42.3	40.6	43.3	19.83	14.05	Butter size of wheat, peas and corn when buttermilk drawn. Given 150 to 200 rev. of churn in wash water. Butter massed.
" " below 60°..	45.	42.2	41.6	42.6	19.2	14.00	
Av. of both...........	46.	42.25	41.1	42.95	19.51	14.025	
Overchurning in brine	44.	42.3	42.6	42.9	18.	14.5	Butter given 150 to 550 rev. of churn in brine. One lot allowed to stand in brine 15 min. Two lots overchurned in brine by dissolving 10 lbs. salt in 100 lbs. water for 1st brine and given 10 revs. of churn; 2nd brine, 20 lbs. salt in 80 to 85 lbs. water, 550 rev. of churn. Two lots in this group scored half point down for salt.
Regular, Cream same as preceding group	45.	41.	41.	42.3	19.8	14.4	

Conclusions.

1. There was not a constant relation between moisture in the butter and the "overrun" in the various experiments. Sometimes there would be a comparatively high moisture content in the butter combined with a somewhat low "overrun" and *vice versa*. This is a point which we are not able to satisfactorily explain at present. These results are similar to those obtained last year.

2. Overchurning in the buttermilk, massing the butter in the wash water or in brine, and washing butter with the rollers in motion, especially when the butter is soft from using a wash water rather warm, tend to produce a butter with a high moisture content, but in order to be effective these abnormal methods have to be carried to a point where the tendency is to produce a greasy, gritty, mottled butter.

3. The flavor of the butter does not appear to have been affected very much by the various methods adopted.

4. We may repeat what we said last year on this question: "We should consider there is risk in following any of these plans recommended for increasing the "overrun." A buttermaker should aim to make the *finest quality of butter* rather than to see how large an "overrun" can be obtained." We would add, there is also a danger of overstepping the 16 per cent. moisture limit set by law, if these abnormal methods are followed.

EXPERIMENTS IN CHEESEMAKING.

Pasteurization of Milk for Cheesemaking.

It is doubtful if the pasteurization of milk for cheesemaking will ever become practicable in Canada for handling large quantities of milk. The labor and expenses of heating and cooling from 10,000 to 30,000 lbs. milk daily would be very great—in fact almost prohibitive. In European countries, we understand that the pasteurization of milk for cheesemaking is frequently practised.

In previous experiments on this question we found it necessary to add a soluble lime salt, such as calcium chloride, to pasteurized milk before the rennet would coagulate the milk properly. Even then, the coagulum or curd was of a flocculent, weak nature and the cheese tended to be soft and porous.

This year, a rather heavy (1½ to 3%) lactic acid culture (starter) was added to the pasteurized milk some time before putting the usual quantity of rennet into the vat of milk. The results were very similar to those obtained by the addition of a soluble lime salt. The rennet coagulated the milk, but the curd was weak in body.

There were five experiments made, one each month, during the season. Altogether there were used 2,980 lbs. milk testing an average of 3.5 per cent. fat. The milk was first mixed together for each experiment, then divided into two equal parts. One part was heated to 180° F. in a milk pasteurizer, then it was cooled, culture was added, then rennet, and afterwards handled along lines similar to those followed in ordinary Canadian Cheddar Cheesemaking. The other part was made into cheese in the usual way.

The average percentage of fat in the whey from the pasteurized milk was .35 and from the normal milk .25. The pasteurized milk produced an average of 106.8 lbs. cheese per 1,000 lbs. milk. The yield from the normal lots was 92.4 lbs. cheese per 1,000 lbs. milk. This was an increase of nearly 14½ lbs. cheese per 1,000 lbs. milk in favor of the pasteurizing.

The cheese made from the pasteurized milk shrank 4.5 per cent. in one month while the normal lots shrank 3.7 per cent. in the same time. The average score of the cheese made from pasteurized milk was 88 out of a possible 100, while the normal lots scored an average of 89.79. The chief difference in quality was in closeness and texture. The cheese made from the pasteurized milk tended to be open and weak in body and texture. The cheese made from the pasteurized milk might suit local markets where a soft cheese is wanted, but would not suit the requirements of the export trade. On the whole, the results were not very satisfactory and we shall require more light on the subject of making pasteurized milk into cheese, before we could recommend the method to Canadian cheesemakers. The striking point in the experiments was the very marked increased in yield of cheese from the pasteurized milk.

RECOVERING MORE OF THE MILK SOLIDS IN CHEESEMAKING.

Milk contains about twelve and one-half per cent. of solids. In the ordinary process of cheesemaking about one-half these solids are recovered and one-half is lost in the whey. Thousands of dollars worth of the most valuable human food material ever prepared by nature or in any laboratory, are annually wasted in Canada, or this human food is fed to hogs after partially decomposing in whey tanks. Owing to the exceedingly high price of butter some of our cheese factories are reviving the method of making butter from the fat in whey, thus recovering the most of the milk-fat which is ordinarily lost in making cheese.

With a view to discovering some means whereby a greater proportion of the milk solids than is now got from milk could be recovered, we conducted some experiments during the past year, to see if we could not reduce the loss of solid material in the whey. From time immemorial, rennet, the active principle usually obtained from the stomach of calves, has been used for coagulating milk for cheesemaking. Rennet acts only on the casein of milk, causing it to curdle or coagulate and at the same time it (the casein) holds mechanically the greater portion of the fat and to some extent the other solids not fat of the milk. Most of the solids not fat, other than casein, pass into the whey or liquid part. To recover all, or a portion of these, was the task set ourselves. We are free to confess at the outset, that we were disappointed in our results, but not discouraged. It is not necessary at this stage to name the agents which we used in our work, which was only preliminary for the present year. Four experiments were made in August, using for the work 2,364 lbs. milk, testing an average of 3.7 per cent. fat. In each experiment the milk was first mixed in a vat, then divided by weight into two equal parts and placed in two separate vats. One vat was coagulated with rennet in the usual way and the curd was treated as in the regular process of cheesemaking. The other vat was coagulated with an agent we shall call, R A2, for convenient reference. The average percentage of fat in the whey from the vats coagulated with rennet was, .24, and in the whey from vats coagulated with R A2 was,

.25, or practically the same as from the rennet lots. Both lots were handled quite similarly at all stages of making except the difference in the coagulating agent.

Previous to making the vat experiments in the cheese department of the dairy, small laboratory tests were made to compare the R A2 coagulating agent with rennet, but nothing special developed in these laboratory tests except that the coagulum (curd) did not appear quite so smooth from the R A2, as from rennet.

The first comparative vat tests were made August 1st, in two vats of milk holding 300 lbs. milk each. The milk apparently contained but 11.6 per cent. total solids, which is very low. The whey, at the time of dipping from the vat in which rennet was used, contained 7.2 per cent. solids, while the whey from the R A2 vat contained 6.8 per cent. solids. These results from the whey seem somewhat high, i.e., there was apparently too great a percentage of solids in the whey. The yield of green cheese from the vat coagulated with rennet was 28.31 lbs. and from the vat coagulated with R A2, was 28.06. The weights of ripened cheese were respectively, 27.31 and 27.13. In both cases there was a slight difference of yield in favor of the vat coagulated with rennet. The percentages of moisture in the curds at dipping and in the green cheese, for the rennet, and R A2 vats were 48.4 and 46.8, 34.8 and 34.4, respectively.

This experiment was repeated on August 2nd. The whey from the vat of milk coagulated with rennet contained 5.8 per cent. solids while the whey from the R A2 vat contained 4.8 per cent. solids. The percentages of moisture at dipping and in the green cheese were respectively, 52.8 and 46.4, 35.2 and 34.5 for the rennet and R A2 lots. The weights of green cheese and cheese at the end of one month were 31.43 and 31.50, 30.43 and 30.50, respectively, from the rennet and R A2 coagulating agents. In this trial the results were in favor of the new agent for coagulating, but it was not very decisive, except that the solids in the whey were one per cent. less by using the R A2, as compared with rennet.

We were unable to continue the laboratory work any further at this point, but two other tests were made in the cheese room on August 16th and 17th. In these tests, the relative weights of green cheese were 28.81 and 29.06 lbs. on the 16th. The weights of cheese at the end of one month were 27.75 and 27.94. The larger yields were obtained by using the new agent. On the 17th, the yield of green cheese was the same from both coagulating agents. The weights of ripened cheese were 26.25 and 26.19—a slight difference in the weight of the cheese at the end of one month in favor of the lot coagulated with rennet.

The average yield of the four experiments was 94.5 lbs. cheese, one month old, per 1,000 lbs. milk for each of the agents. The total weight of ripe cheese from the vats coagulated with rennet was 111.74 lbs. and from the vats coagulated with R A2, 111.76 lbs. The cheese made on August 1st, and 2nd, were ripened in mechanical cold storage, and those of August 16th, and 17th, were ripened in our ice cold storage.

The average percentages of acid were: at the time of dipping .182 for both lots; .725 and .75 at milling; and .91 and .921 at salting, respectively for the rennet and R A2 agents.

There was not much difference in the quality of the cheese, what there was being in favor of those made with the new coagulating agent.

The table shows the average scores of the cheese in the four experiments.

Coagulating Agent.	Flavor 40	Closeness 15	Even Color 15	Texture 20	Total 100
Rennet....................	37	13.25	14.12	17.75	92.1
R A2......................	37	13.5	14.1	17.87	92.5

It would be unwise at this stage to attempt to draw any conclusions. The results have been less promising than we had hoped for. However, we shall continue the investigations next year with similar or other coagulating agents, in the hope of discovering some agent which will more or less completely precipitate the milk solids in a palatable, digestible and marketable form as human food.

AMOUNT OF MILK SOLIDS LOST IN MAKING OVERRIPE MILK INTO CHEESE.

In conjunction with the Chemical department of the College, a series of tests was planned to ascertain the extra loss of milk solids by allowing milk to become "overripe" or partly sour before making it into cheese. Considerable difficulty was experienced in conducting these experiments. If we selected milk which had been allowed to become overripe by the patrons, we should not have a proper basis of comparison with normal milk, as the lots might differ considerably in other respects. If we mixed the milk together and allowed one-half to stand for some time before commencing to manufacture it into cheese. the objection might be raised that this is not a natural method. We tried both plans, but our results were not altogether satisfactory, and we should prefer withholding the data on these experiments until we have a further opportunity to verify our results. The results got this year are so different from what has been commonly accepted that we hesitate to publish them until we are able to conduct further tests.

METHODS OF CUTTING CURD FROM OVERRIPE MILK COMPARED.

A certain amount of milk is delivered at cheeseries in a more or less overripe condition, i.e., it has too much lactic acid, or is too sour, in order to make the finest quality of cheese. If the milk be altogether too ripe and wholly unfit for cheesemaking, the cheesemaker usually returns it to the patron. However, there is always a certain proportion of the milk, especially on Mondays during very hot spells, which the cheesemaker tries to handle in the best manner possible so as to avoid returning it to the patron, as this nearly always causes trouble. Various cheesemakers have various methods of handling such milk. Cutting the curd finer than usual is a standard practice among most cheesemakers. Some, keep a special curd knife for what are known as "fast-working curds." This knife usually has the blades or wires closer together than is the case with the ordinary knife. In the ordinary curd knife, the blades, or wires, are usually one-half inch apart, thus cutting the curd into what are known as "half-inch-cubes." The modern tendency is to discard the steel blades in the perpendicular knife and substitute fine wires strung on a suitable steel frame. The tendency is also towards having both the wires and steel blades ⅜ of an inch apart, rather than half an inch.

Last winter we had a perpendicular curd knife made of fine wire and having the wires one-quarter of an inch apart, to use in "fast-working curds." The object of the experiments here noted was to compare results got with this special knife, with those got from using the knife having wires ⅜ inch apart and cutting the curd five to seven times. Altogether there were fifteen expriments made, comparing the ¼ inch fine wire perpendicular curd knife and cutting twice only, with the ordinary ⅜ inch perpendicular curd knife and cutting five to seven times. Both lots were cut once only with ⅜-inch horizontal blade knife. For this work were used 13,714 lbs. milk testing an average of 3.8 per cent. fat. The average length of time during which the curds from the vats cut with the ¼ inch knife "stayed in the whey" was one hour and fifty minutes. The vats cut five to seven times, with the ⅜ inch knife remained in the whey an average of one hour and fifty-three minutes. The whey from the lots cut with the fine knife (¼ inch) tested an average of .26 per cent. fat, while the lots cut with the ⅜ inch knife tested an average of .39 per cent. fat—a difference of .13 in favor of cutting with the fine knife.

The percentages of acid at dipping were .198 for both lots. At milling, the average percentages of acid were .724 and .693 and at salting 1.01 and .972 respectively for the lots cut with the fine, and ⅜ inch knife.

The yields of cheese and percentages of shrinkage are shown in the following table:

Kind of Cheese.	Where Ripened.	Weight Cheese.		Percentage. Shrinkage.
		Green.	Ripe.	
		Lbs.	Lbs.	
A. Curd cut with fine knife..	Mechanical Cold Storage..................	216.19	209.62	3.07
B. Curd cut with ordinary knife.................	Mechanical Cold Storage..................	213.38	207.06	2.90
A.	Ice Cold Storage........	488.98	478.82	2.07
B.	Ice Cold Storage........	486.13	475.39	2.02

It will be noticed in the foregoing table that the yields of both green and ripened cheese were greater in both mechanical and ice cold storage by using the fine wire knife for cutting the curds. The shrinkage during one month was also slightly greater in those lots where the fine knife was used.

There appears to be little difference in the quality of the cheese from the two methods as indicated by the scoring. The average total scores of the cheese made by using the ¼ inch knife were, 91.9, and 91.58 respectively for the lots ripened in mechanical and ice cold storage. The lots made by cutting the curds with the ordinary knife scored 92.1 and 91.45 in the two storages.

Conclusions.

For fast working milk, a knife made of fine wire (30 gauge) and having the wires ¼ inch apart is evidently an improvement over the regular form of curd knife. The advantages are, less loss of fat in the whey and an increased yield of cheese, amounting in these experiments to nearly one pound cured cheese per 1,000 lbs. milk.

A WIRE CURD KNIFE *vs.* STEEL BLADE CURD KNIFE.

In order to compare the results from using a perpendicular blade curd knife, having the blades ⅜ of an inch apart, with a wire curd knife having the wires the same distance apart, twenty-two experiments were made on normal milk. Altogether there were used 17,460 lbs. milk testing an average of 3.89 per cent. fat. From 600 to 1,000 lbs. milk were used for each experiment. The whey in the vats cut once with a horizontal blade knife and twice with the ⅜ inch blade knife, tested an average of .23 per cent. fat. The whey from similar vats of milk cut once with the blade horizontal knife and twice with the perpendicular ⅜ inch wire knife, tested an average of .26 per cent. fat. The general tendency was for the whey to test a little higher in fat where the curds were cut with the wire knife. This could be obviated to some extent by using finer wire and by having the steel frame at the end which is inserted into the vat, made sharp so that it would cut its way through the curd instead of bruising it. We understand such knives are now made. The wire curd knife has the advantage of being much lighter to handle and will doubtless supplant the blade curd knife in the near future.

The average yield of cheese per 1,000 lbs. milk was 98.8 lbs. from the blade knife, and 98.5 lbs. by using the wire knife—a slight difference in yield of cheese in favor of the blade knife.

The cheese from the curds cut with the blade knife lost 2.6 per cent. in weight during one month in cold storage, while those cut with the blade knife lost an average of 2.5 per cent. in the same time. In the ordinary ripening (curing) room the cheese from the curds cut with the blade knife lost an average of 3.06 per cent. during one month, while those from cutting with the wire knife lost 3.18 per cent. in one month. The average shrinkage in both places of ripening for each method of cutting was 2.87 per cent. during one month.

The average total score of the cheese for the blade method of cutting, was 93.88 in cold storage, while the cheese made by using the wire knife averaged in the cold storage 93.84, or practically the same. The remainder of the cheese were ripened in the ordinary ripening room. Those from curds cut with the blade knife averaged 90.5 out of a possible 100, while those from cutting with the wire knife scored an average of 89.83.

Conclusions.

1. The tendency was for a slightly greater loss of fat in the whey by using the perpendicular wire knife for cutting curds as compared with the blade knife, both knives having the wires or blades ⅜ of an inch apart.
2. There was little difference in the quality of the cheese, or the shrinkage during ripening, from the two methods.
3. As the wire knife is much lighter and more convenient to handle, we think it is superior to the ordinary steel blade knife for the cutting of curds to be made into Canadian Cheddar cheese.

MOISTURE IN CURD AND CHEESE.

The experiments relating to this question have now been conducted for five years. During 1907 twelve experiments were made in which 11,266 pounds of milk testing an average of 3.82 per cent. fat were used. The object of the experiment was to see the effect of not stirring curds and also the effect of stirring curds very little after what is commonly known as "dipping" the curd, *i.e.*, removal of the whey or liquid part from the curd or solid material. For these tests, from 600 to 1,400 lbs. milk, as delivered by patrons who live near the College was mixed, colored and culture (starter) was added at the rate of about one per cent. The milk was then divided equally between two vats and both worked as nearly alike as possible up to the time of "dipping." The A vats of curd were not stirred at all or were stirred very little. The B vats were treated in a normal manner, *i.e.*, were stirred a number of times after dipping, until the cheesemaker considered the curd had about the proper degree of moisture before allowing it to mat, *i.e.*, become a solid mass.

TABLE SHOWING PERCENTAGE OF MOISTURE IN CURD AND CHEESE.

Kind of Curd and Cheese.	Per cent. Moisture in Curd at			Per cent. Moisture in	
	Dipping.	Milling.	Salting.	Green Cheese.	Cheese 1 month old
A. Excessive moisture	53.670	40.884	39.057	34.777	34.05
B. Normal moisture	48.437	39.633	38.346	34.272	33.81
Average difference	5.233	1.251	.711	.505	.14

It will be seen by the foregoing table that the normal curds averaged about five per cent. less moisture at the time of "dipping" than did those which were not stirred. At milling, the difference in the moisture content was a little over one per cent., at salting about three-quarters of one per cent., and in the green cheese the difference had fallen to one-half per cent, while at the end of one month there was very little difference in the moisture content of the cheese. Stated another way: The curd with an excessive amount of moisture at the time of dipping lost nearly 24 per cent. of its moisture between dipping and milling; 4½ per cent. between milling and salting; 11 per cent. between salting and green cheese, and 2 per cent. while ripening for one month—part in an ordinary ripening room and part in an ice cold-storage.

The normal curds lost about 18 per cent. of their moisture between dipping and milling; 3 per cent. between milling and salting; 10 per cent. between salting and time of taking cheese from the hoops (green cheese) and about one and one-third per cent. while ripening for one month—part of the cheese in an ordinary ripening (curing) room and part in cold-storage (ice).

The greatest percentage of moisture lost was between dipping and milling in both lots and the next greatest loss was between the salting stage and that of green cheese. These losses at the different stages of cheesemaking for both curds are seen more strikingly in the table.

The moisture in all cases was determined by following the method described in my last report, viz., drying for about five hours in a steam heated oven at a temperature of 100° to 105°C.

TABLE SHOWING PERCENTAGE OF MOISTURE LOST IN CURD AND CHEESE AT DIFFERENT STAGES.

Kind of Curd and Cheese.	Per Cent. Moisture lost between			
	Dipping and Milling.	Milling and Salting.	Salting and Green Cheese.	Green and Ripened Cheese.
A. Excessive moisture at dipping	23.8	4.4	10.9	2.1
B. Normal moisture at dipping...........	18.1	3.2	10.6	1.3

The percentage of fat in the whey averaged .266 for the A lots and .267 for the B lots. The A cheese shrank during one month, 2.04 per cent. in the ice storage (temp. about 40°F.) while the B cheese shrank 2 per cent., or practically the same. Part of the cheese were ripened in an ordinary ripening room to see the effect under conditions as found in average factories. Both the A and B cheese in this room shrank 3.22 per cent., or about one and one-quarter per cent. more than did those lots which were in the ice storage.

The yield of ripened cheese (one month old) per 1,000 lbs. milk was 97.2 for the lots with excessive moisture at the time of dipping and ripened in an ice cold storage. The normal curds yielded an average of 97 lbs. cheese under similar conditions. The lots ripened in the ordinary room yielded per 1,000 lbs. milk, 96.9 and 95.9 lbs. cheese respectively, for those containing an excessive and normal amounts of moisture in the curds at dipping.

QUALITY OF THE CHEESE.

The cheese were scored the first time when six weeks to two months old, and again at intervals of about one month until sold. The table gives the average of all scorings. All cheese were scored full (10) points for "finish," hence, this is not given in detail, but is included in the total score.

Kind of Cheese.	Method of Ripening.	Flavor. 40	Closeness. 15	Color. 15	Texture. 20	Total.
A.—Excessive moisture...........	Ice-cold storage 40°......	36.7	14.07	14.3	18.4	93.57
B.—Normal "	" " "	36.7	14.14	14.3	18.3	93.50
A.—Excessive moisture...........	Ordinary room 65°......	35.9	13.35	14.3	17.60	91.20
B.—Normal "	" " "	36.1	13.50	14.4	17.65	91.85

Comments on Foregoing Table.

1. There was practically no difference in the quality of the cheese made from curds having an excessive amount of moisture at dipping as compared with cheese made from curds having a normal amount of moisture, when both were ripened in cold-storage at a temperature of about 40°F.

2. Those lots of cheese made from curds containing an excessive amount of moisture, which were ripened in an ordinary ripening (curing) room tended to be somewhat poorer in quality than were similar cheese made from normal curds. These results agree with those obtained in former experiments and indicate that it may not be advisable to have an excessive amount of moisture in the green cheese when placed in the ordinary room for ripening. In these experiments the average difference in the moisture content of the green cheese was only about one-half of one per cent., but even this amount appeared to have a deleterious effect on the cheese when allowed to remain for a considerable time at a temperature between 60° and 70° F. The cheese ripened at 40° were not so affected in the quality of having an excess of about one-half per cent. moisture in the green cheese.

In addition to the foregoing experiments, five others were made with larger quantities of milk to see if similar results were obtained. The factoryman may object to the previously reported tests on the ground that the quantity of milk was too small. In studying dairying principles, it is well not to have too large an amount of milk to handle, otherwise we may not be able to control all the conditions and consequently defeat the special objects we have in view. It is at this point many experimenters fail. They either try to get too much out of one experiment, or have so much milk to handle that it gets beyond their control for accurate observations.

In order to study the effect of not stirring curds from a larger volume of milk than that used in previous work, five lots of milk totalling 10,570 lbs., averaging 2,114 lbs. each, and testing 3.8 per cent. fat, were treated the same as those from smaller vats with an excessive moisture, except that in these experiments the curds were dipped into a tin-lined curd sink having wooden racks covered with a cloth for draining purposes, such as is common in Western Ontario cheese factories.

The whey tested an average of .24 per cent. fat. The cheese were ripened in mechanical cold-storage at a temperature of about 40° F. During one month they lost an average of 2.9 per cent. in weight. The yield of cheese one month old was 95.6 lbs. per 1,000 lbs. milk. The lower yield of cheese, as compared with the other experiments reported may be accounted for by the fact that those made with the larger quantities of milk were conducted on Mondays of the week. Milk held over Sunday never produces so large a yield of cheese as will similar milk delivered daily.

The average percentages of moisture in the curd were, 53.76 at dipping; 41.58 at milling, and 34.46 at salting. The green cheese contained an average of 33.88 per cent. and the cheese at the end of one month 34.36 per cent. moisture. We are unable to account for this apparent increase of moisture in the cheese at end of one month, unless due to errors in sampling. The loss of moisture between dipping and milling was 22.6 per cent.; between milling and salting 7.5 per cent., and between salting and green cheese 11.9 per cent. of the moisture in the curd at the time of dipping was lost. These results agree fairly close with those obtained in the other experiments, except at the stage between milling and salting, when the loss of moisture in these larger curds was greater.

The average score of the cheese was 34.85 points in favor, 14.07 for closeness; 14.3 for even color; 17.3 for texture and a total of 90.5, including 10 for finish. The quality of the cheese was apparently not so good as in the previous experiments. This may be partly accounted for by the fact that the cheese were made from Monday's milk, which is usually poorer in physical qualities, *i.e.*, it is more likely to be "gassy," "over-ripe," have bad flavors, etc.

Conclusions.

1. The acid developed somewhat faster on the moist curds after dipping. Both curds had an average of .19 per cent. acid at dipping. The curds left moist had developed .635 per cent. at milling while the normal curds had .55. At salting the moist curds had .949 per cent. acid and the normal curds .91. These facts indicate that a maker may expect the acid to "work faster" on the moist curds and he needs to be careful that it does not "get ahead of him." With proper facilities for draining the curd there is little danger on this point.

2. Last year with a difference of 4.682 per cent. moisture in the curds at the time of dipping, the green cheese contained a difference of "less than one-half of one per cent." This year, the average difference in the curds at dipping was 5.233 per cent., and again the difference in the moisture of green cheese was about one-half of one per cent. Practically the same relative difference continued in the cheese at the end of one month. In the curds and cheese from larger quantities of milk, we find about the same percentage of moisture as from the smaller vats. Many makers spend a great deal of energy "stirring curds," which according to these experiments might be saved, as the curds will, if properly handled, drain sufficiently of themselves and an increased yield of cheese will result. For the last three years we have obtained an increased yield of cheese of from one-half to one pound per 1,000 lbs. milk by following this plan. We do not advise cheesemakers to hastily change their methods, but to try the plan in a small way at first. One maker has told us that he was able to make quite an increased yield of cheese at his factory by following the suggestions given along this line, and he also thought the quality of his cheese was as good as when he followed the older method of stirring the curd; in fact he thought his cheese were better, more "meaty" etc.

3. The greatest loss of moisture appears to be at the stage between dipping and milling, probably about 20 per cent. of the total moisture in the curd being lost at this time. The next greatest loss is apparently after salting, when the addition of salt causes a rapid expulsion of the whey. From 10 to 12 per cent. of the moisture at the time of dipping is expelled at this time. From 3 to 4 per cent. is lost between milling and salting and 1 to 3 per cent. while ripening for a month in cold storage at 40° F. The loss is greater than this in an ordinary ripening room, depending upon temperature of room, size of cheese, etc.

ACIDITY OF CURD AT TIME OF SALTING.

This is the third year in which we have conducted experiments to determine the effect of salting curds from one to two hours sooner than is sometimes considered safe by Canadian Cheddar cheesemakers. If salted before the curds become "mellow" and show "considerable grease," the maker is afraid his cheese will be "open." All the time the curd is held for the development of this "mellow feel" the fat is gradually oozing out, which means a distinct loss in cheesemaking material and it is doubtful if the gain in "closeness" compensates for the loss of moisture, caseous material, and fat.

During the past season, twenty-five experiments were made on this question to determine the loss from ripening curds too much before salting and also to determine the effect on the quality of the cheese when salting took place one to two hours sooner than is customary with some makers. For the tests, 30,420 lbs. milk were used. The average percentage of fat in the milk was 3.8, and in the whey .23. From 600 to 2,100 lbs. milk were used for each experiment. The curd of each experiment was kept in one lot until the first curd was ready for salting. At this time the curd was divided into two or three equal parts by weight, according to the amount of curd on hand. If the quantity of curd was sufficient for only two cheese, then the curd was divided into two equal parts, one of which was salted about one hour before the other. If the quantity of curd was sufficient to divide into three cheese, then one curd was salted two hours sooner and the other about one hour sooner than the third curd. The table shows the main points in the experiments.

TABLE SHOWING RESULTS OF SALTING AT VARIOUS STAGES OF ACIDITY.

Cheese	Average % acid at			Av. time from Dipping to Salting	Av. Lbs Ripened Cheese per 1000 Lbs Milk	Average Temp. of Ripening room	Av % Moisture in air of Ripening room	Av % Shrinkage in one Month	Average Score for				
	Dipping	Milling	Salting						Flavor 40	Closeness 15	Color 15	Texture 20	Total 100
				H.M.									
A	.193	.657	.81	3.2	98.9	41.3°F	83	2.67	36.6	13.91	14.23	18.44	93.18
B	.193	.657	.93	4.11	98.6	41.3°F	83	2.45	36.4	13.94	14.23	18.18	92.82
C	.193	.657	—	5.15	97.2	41.3°F	83	2.32	36.4	14.05	14.30	18.30	93.05
A	.186	.588	.78	3.2	97.9	57.9°	78.5	3.24	35.82	13.9	14.4	17.36	91.5
B	.186	.588	.89	3.48	97.0	57.9°	78.5	3.05	35.63	13.8	14.36	17.11	90.9
C	.186	.588	—	5.1	96.1	57.9°	78.5	2.80	35.40	14.1	14.4	17.10	91·0

Conclusions.

1. The increased yield of cheese ripened in cold storage by salting on an average of about three hours after dipping was over 1½ lbs. per 1,000 lbs. milk as compared with salting about five hours after dipping. In the case of cheese ripened in the ordinary ripening (curing) room at about 58° F., the increased yield of cheese was nearly two pounds per 1,000 lbs. milk by salting at the end of three hours as compared with five hours after dipping. By lengthening the time of salting to about 3¾ hours after dipping, the decreased yield of cheese was about one-third of a pound in cold storage and nearly one pound in the ordinary room, per 1,000 lbs. milk. This difference in time corresponds to about .1 per cent. of acid increase for each hour, after three hours from dipping. It was difficult to secure sufficient whey for a reliable acid test in the case of the C. cheese, hence the acidity on these is omitted.

2. The shrinkage was somewhat greater from the cheese salted early, both in cold storage and in the ordinary room, indicating that some at least of the extra moisture retained in the curds salted early is lost during the ripening (curing) process.

3. There was apparently very little difference in the quality of the cheese made from the curds salted at the different stages of acidity. What difference there was seemed in favor of the cheese salted early, as indicated by the total score, though those salted later tended to be somewhat closer in body.

4. Cheesemakers may very well consider whether or not it will pay to wait one or two hours longer than usual for the curd to "mellow down," thus wasting cheesemaking material and losing valuable time. A few careful experiments will enable a man to know how much acidity at the time of salting is needed in order to produce fine cheese. To go beyond this point is unnecessary.

All of which is respectfully submitted.

H. H. DEAN.

November 30, 1907.

PART X.

THE PROFESSOR OF BACTERIOLOGY.

To the President of the Ontario Agricultural College:

Sir,—I have the honor to submit the following report of work done by the department of Bacteriology during the year ending November 30th.

Instruction.

Courses were conducted for College, Macdonald and short course students as laid down in their respective calendars.

One man is pursuing the Bacteriology option this year, and five seniors are working theses in this laboratory.

The methods of instruction varied somewhat from previous years. The sophomore work was made to consist as largely as possible of lecture room and laboratory demonstrations, although the size of the class precluded the possibility of giving systematic laboratory work. The seniors in the Agriculture option have received laboratory work only, instead of lectures only as heretofore, and the greatly increased interest they have displayed in the subject is gratifying. It also furnishes a true index of the necessity for further laboratory work. No science can be successfully taught by lectures and text books alone. No boy can learn to plow by observing pictures and reading descriptions of various kinds of plows and methods as to their use, be the instruction ever so lucid. He must needs get into the field and plow. Show a boy pictures and text book descriptions of organisms so small that a powerful microscope is required to render them visible to his eye, and explain to him that the presence of such organisms in the soil is as essential in the production of crops as the use of the plow itself. He is unable to comprehend such a possibility. Yet give him an opportunity to handle such organisms in the laboratory, and he will soon determine for himself that micro-organisms are essential, not only in actual tillage of the soil, but in every phase of his farm life. Further, he learns how to handle these organisms in a practical way, using to the best advantage those that are useful, and combatting with success those that are harmful. At the close of the lecture course to the sophomore class last winter the men were asked for a written expression of opinion as to how the course might be improved, and they were almost unanimous in the statement that without laboratory practice they were unable to form clear ideas of the work, and that as the instruction must necessarily be carried on in the present quarters of the department, the retaining of it must be a mere matter of memorizing.

Upon no science is successful agriculture more dependent than upon Bacteriology. The best agricultural colleges of the United States already have extensive courses in Bacteriology, and I would respectfully urge upon you the necessity for more time and more ample laboratory space for instruction in Bacteriology in this College.

MEETINGS ATTENDED.

I addressed two meetings during the year, the Western Ontario Dairymen's Association on "Bacteria and Milking Machines," and the annual meeting of the Mohawk Farmers' Institute on "Bacteria as Related to Farming."

Two special lectures on canning and preserving of fruits and vegetables were given to the Domestic Science classes of Macdonald Institute.

PUBLICATIONS.

The result of our investigation as to the bacterial content of milk as influenced by the Burrell-Lawrence-Kennedy milking machine, was published in collaboration with Prof. Dean's investigation as Bulletin 159.

One press bulletin was written, and a few contributions were made by Mr. Barlow and myself to current agricultural periodicals.

ROUTINE LABORATORY WORK AND ANALYSES.

During the year we have distributed sixty doses of tuberculin and eighty-six lactic starters for creameries and cheese factories.

Bacteriological analyses and reports were made on the following specimens during the year:

Anthrax	3
Cat (suspected poisoning)	1
Cheese	1
Diseased hens	25
" chicks	3
" goslings	2
" pheasant	1
" turkey	1
" organs	4
Dog (suspected poisoning)	1
Fire Blight	2
Foul Brood	1
Hog Cholera	2
Hydro-nephrosis in hog	1
Contagious abortion (suspected)	1
Ice	5
Milk (off flavored or suspected of causing disease)	7
Plant Diseases	7
Pus	3
Sputum (suspected tuberculosis)	5
Tuberculosis (animal)	1
Suspected diphtheria	6
Urine	1
Water	9
Total	93

The preparation and distribution of cultures for inoculating the seed of legumes has taken a great deal of time. The accompanying table shows the number and kinds of cultures sent and their destination:

Province.	Alfalfa.	Red Clover.	Beans.	Soy Beans	Alsike.	Peas.	Vetches.
Ontario	170	54	5	1	2	29	1
Quebec	11	3	2	—	—	3	—
Nova Scotia	3	4	4	—	2	2	—
New Brunswick	5	3	—	—	—	—	—
P. E. Island	3	—	—	—	—	—	—
Newfoundland	1	—	—	—	—	—	—
Manitoba	1	5	—	—	—	2	—
Saskatchewan	4	2	—	—	—	—	—
Alberta	18	—	—	—	—	—	—
British Columbia	6	4	—	—	—	2	—
United States	8	1	—	1	2	—	—
England	—	5	—	—	—	—	—
Scotland	—	1	—	—	1	—	—
Total	230	82	11	2	7	38	1

Besides these, one hundred and eighteen cultures were prepared and sent for the Truro Agricultural College. Reports were received from experimenters as shown in the following table, benefit having been derived from the use of the culture in a little over fifty-four per cent. of the experiments:

Province.	Alfalfa.		Red Clover.		Alsike Clover.		Peas.		Beans.		Sweet Pea.	
	Benefit.	No Benefit.	Benefit.	No Benefit.	Benefit.	No Benefit.	Benefit.	No Benefit.	Benefit.	No Benefit.	Benefit.	No Benefit.
Ontario	36	28	6	11	2	..	2	2	1	..	..	..
New Brunswick	2	..	1	..	..	..	..	..	..	..	..	..
Saskatchewan	1	2	..	..	..	..	..	..	..	..	..	..
Alberta	1	1	..	..	..	..	..	..	..	..	..	..
P. E. Island	2	.	..	..	..	..	..	..	..	..	..	..
British Columbia	1	2	..	2	..	..	..	..	..	..	1	1
Quebec	3	1	..	..	..	..	..	..	..	1	1	..
Manitoba	1	1	..	1	..	..	..	..	..	..	..	..
Nova Scotia	1	..	2	..	..	1	..	..	2	..	..	..
Indiana	..	1	..	..	..	..	..	..	..	..	..	..
England	..	..	..	1	..	..	..	..	..	..	..	..
Ohio	..	..	..	..	1	..	..	..	..	..	..	..
Total	48	36	9	15	3	1	2	2	3	1	2	1

The complete report of this branch of the work has already been submitted for publication as a Bulletin of the College.

Research.

We have given considerable attention to research, part of which is complete. Other problems are still under investigation.

Some investigation was conducted upon the disease of incubator chicks known as white diarrhœa. A large number of autopsies were held on healthy and diseased chicks, microscopic and cultural examinations and inoculations of healthy chicks were made, all of which gave negative results, and the conclusion was drawn that white diarrhœa is not an infectious disease. A full report of our work, with a resumé of work done in previous years by Harrison and Barlow, has been submitted for publication jointly with the result of investigation in other departments of the College on the same subject.

During the past few weeks considerable time has been spent visiting canneries of the Province, and in correspondence with Canadian and United States canneries, gathering information as to the nature and amount of cannery refuse, with a view to aiding the Canadian canners by devising a plan for the economic or destructive disposal of such refuse. This work was started late in the canning season and no definite results are yet available.

During the summer considerable loss occurred in the College cucumber forcing house from failure of the fruit to set, or in some cases failure to mature after being well started. Many of the young fruits, and in some cases the tips of pruned stems, showed a soft rot. Several species of common saprophytic bacteria were isolated from these affected portions and inoculated into the healthy plant tissue. These inoculations were negative in every instance, as would be expected from saprophytic forms. The partial failure of the crop was attributed to faulty "climatic conditions" present in the forcing house, which lowered the natural vitality and resistance of the plants, rendering them susceptible in a limited degree to infection from ordinary saprophytic bacteria.

CABBAGE RESISTANCE TO BLACK ROT.—Among the varieties of cabbage grown this season in the garden of the Horticultural Department, there was one, the Houser, which had been advertised as proof against black rot. This Houser cabbage grew with great vigor and suffered no appreciable injury from the disease, and it was only by close observation that occasional infections could be found. Other varieties grown in adjacent rows suffered severely from black rot as they have in previous years. Our seniors in Horticulture and Biology potted some of these Houser cabbages and inoculated them in the laboratory with pure cultures of the black rot bacteria. The disease did develop from the point of inoculation, but advanced slowly, and even under these severe laboratory conditions it worked but little injury. Some of the inoculations were without any result. We conclude that this variety of cabbage is practically immune to black rot under field conditions.

I take this opportunity to express my appreciation of the assistance of Mr. Barlow, who has labored diligently and persistently and has contributed largely to such success as the laboratory has achieved during the year.

Respectfully submitted,

S. F. EDWARDS.

November 30th, 1907.

PART XI.

THE PROFESSOR OF HORTICULTURE.

To the President of the Ontario Agricultural College:

Sir,—I have the honor of presenting herewith my fifteenth annual report on the work of the Horticultural department.

Horticulture on the College Curriculum.

In doing so I wish to refer briefly to the great development which has been made in the horticultural course at the College, and also horticultural work throughout the Province. When I took charge of the department fifteen years ago, the course in horticulture consisted of not more than half a dozen lectures, which were principally on fruit-growing and were given to the students of the second year only. At that time horticulture had not made the progress in Ontario it has to-day, and such a course did not seriously reflect upon the College as a progressive institution. But times have changed since then. We now offer a wide course of instruction in horticulture in all its branches, including fruit-growing, vegetable gardening, floriculture, and landscape gardening. First year students receive an extensive course in the first principles of horticulture. Second year students receive a course in lectures throughout the year covering all branches of the subject, and in connection therewith get regular instruction through demonstration and practical work. Fourth year students who take the degree course may now specialize in horticulture and take an extended course in this subject in all of its branches.

With the addition of the Macdonald Institute as a department of the College, the ladies now take a course in horticulture in which special emphasis is put upon floriculture and landscape gardening as applied to home decoration. The teachers' classes attending the Institute also receive a course in horticulture as applied to the management of school gardens.

From this it will be seen that within comparatively few years horticulture has been developed from a very minor subject on the College curriculum to a major one with many branches in which students may specialize and prepare for a University degree.

Horticultural Development in Ontario.

Great as this development on our College curriculum may seem, it has not in any way exceeded the demand from the public, because in no other field has there been a more rapid development and greater specialization throughout the country during the last few years than in horticulture. Fruit-growing has become one of our leading industries, and as evidence of the progressiveness of those engaged in it, we may point out that there are now in Ontario over fifty local and provincial fruit-growers' associations.

Vegetable gardening has also become an important industry, particularly in proximity to towns and cities, so much so that a provincial organization has been formed with which is allied a score or more of local vegetable growers' associations. Floriculture has also made wonderful progress, both from a commercial and an amateur standpoint. In Ontario we now have some of the largest commercial floriculture establishments on the continent, which are shipping cut flowers from one side of the continent to the other. The florists, too, have united for their own best interests in the formation of a number of organizations, both local and provincial.

All of the foregoing are interested in one or another of the various branches of horticulture in a commercial way. In addition to these we have an ever increasing number in both town and country who are giving more and more attention to horticulture from the amateur and aesthetic standpoints. In cities and towns horticultural societies are making progress in beautifying lawns and boulevards and establishing parks and pleasure grounds. In the country progressive property owners are beginning to realize the importance of beautifying home surroundings. As an evidence of the growing interest in this phase of horticulture, we have a Provincial Horticultural Association and sixty-six local horticultural societies, all promoting the work of civic and rural improvement.

Reorganization and Development Needed.

While the instruction of students might naturally be supposed to be the first consideration of our college staff, yet with the great development and organization in the country, the public has learned to look to the College more and more for definite information on all kinds of subjects, and solutions for the many problems which confront the grower. This necessitates much careful investigation and experimental work. In this department at present the responsibility for this work falls upon the teaching staff, which is already occupied the greater part of the year with college work. In this particular there is need for reorganization and greater addition to our staff of workers. The time has arrived when the development and progress of horticulture in this country calls for specialists in the various lines of horticultural work. When the work is so arranged and competent specialists put in charge of it, more will be accomplished and better work will be done.

In presenting a report of the year's work I shall give first a brief outline of the work carried on by the department as a whole. A fuller account of some of the more important work therein indicated will be given under one or another of the four headings: fruit-growing, vegetable gardening, landscape gardening, and floriculture, the branches into which horticulture most naturally is divided.

Outline of the Work in the Horticultural Department.

1. Lecturing to students of the freshman, sophomore, and senior classes; also to the ladies' classes of the Macdonald Institute, and classes of teachers attending the College.

2. Lecturing at horticultural societies and public meetings in about thirty different parts of the Province, and addressing as many excursions visiting the College during the month of June, explaining to them the work in progress in the department.

3 Judging horticultural exhibits at about twenty of the fall fairs and horticultural exhibitions held in various parts of Ontario.

4. Conducting tests with several hundred varieties of fruits in our experimental orchards and small fruit plantation.

5. Originating and testing new varieties of fruits by systematic selection and plant breeding. Several thousand seedlings are now under test.

6. Conducting extensive field and forcing-house experiments with all kinds of vegetable garden crops.

7. Supplying the College and Macdonald Hall with fruits and vegetables throughout the year.

8. Adding a large number of specimens to our museum collections of fruit and vegetable models. This exhibit has now become one of the attractions of the place.

9. Maintaining and keeping in attractive condition forty-two acres of lawn and grounds, upon which are being tested hundreds of varieties of trees, shrubs, and ornamental plants.

10. Assisting a number of school boards and private owners in preparing plans for the improvement of their grounds.

11. Furnishing seeds, plants, and instructions this year to over 3,800 co-operative experimenters. Material has now been distributed for over 8,000 experiments. For an account of this work see the Report of the Experimental Union.

12. Inspecting and reporting upon the work of the twelve Ontario Fruit Experiment Stations. For fuller account of this see the Report of the Ontario Fruit Experiment Stations.

13. Contributing articles on horticultural topics to various newspapers, journals, and magazines.

14. Answering by correspondence thousands of questions sent in from all parts of the country relating to all branches of horticulture.

FRUIT GROWING.

A full course of instruction as outlined in the College curriculum has been given in fruit-growing to the students of the first, second and fourth years. In this work I was ably assisted during the early part of the year by Mr. H. S. Peart, who left in May to take charge of the new Horticultural Experiment Station at Jordan Harbor, and later by Mr. J. W. Crow, who graduated as a specialist in horticulture in May and came on at once to take up Mr. Peart's work. Mr. Crow was given charge of the orchards and fruit plantation, and has prepared the following report on the investigation work conducted therein.

PLANT BREEDING.

The crossing of strawberries and raspberries was largely discontinued this year, and improvement by means of careful selection of plants for propagation purposes was begun. Selection was made of the Older black raspberry, with a view to improving the habit of growth and bearing qualities of the variety. Selection of specially grown strawberry plants of certain varieties will be made during the fruiting season next year.

Attempts were made to cross the European and American plums, *Prunus domestica* and *P. Americana.* The crosses were made reciprocally, several hundred blossoms being operated on in each case. No fruits resulted on any of the Americans, but four fruits were secured as a result of using Americana pollen on Glass Seedling and Shipper's Pride, varieties of *P. domestica.* One fruit was also secured by using Americana pollen on Burbank, a Japanese plum. It was found impracticable to cover the emasculated blossoms on a large scale, and there is consequently a possibility that the fruits procured are the result of natural pollination. It is hoped, however, that such may not prove to be the fact, as no case is on record so far as the writer is aware in which *P. Americana* and *P. domestica* have been successfully hybridized.

A number of crosses were made in apples and small quantities of seed have been secured.

No fruits were produced on Smith's Bigarreau, a sweet cherry, under pollen of several varieties of the sour, or *Prunus cerasus,* class. Montmorency, a sour cherry, was apparently successfully crossed with the cultivated plums, but although the fruits reached nearly full size, they failed to mature.

Prunus Virginiana, the common wild choke-cherry, was successfully crossed with the sour cultivated cherry and with the cultivated plums.

Seed of blueberries was procured and planted, and an attempt will be made to bring this valuable native fruit under cultivation.

COVER CROPS.

The choice of a cover crop depends somewhat on local conditions. On light soils, where it becomes necessary to conserve all the moisture possible, crops which are killed by the cold of winter are preferred. On our cold, wet soil, however, we desire to get rid of a considerable surplus of soil water in spring. For that reason we have found the hardy cover crops more satisfactory because they make strong growth early in the spring and thereby dispose of large quantities of useless moisture. Those which have given the best results in five years' tests are:

Leguminous. Hairy Vetch, thirty to thirty-five pounds per acre. Alfalfa, twenty-five to thirty pounds per acre. Mammoth and red clover (equal in value), twenty pounds per acre.

Non-leguminous. Winter rye, one and one-half bushels per acre.

All of these crops form fairly thick covers, but they are all open to objection because of their failure to catch and hold drifting snow.

ORCHARD FRUITS.

Results secured to date in the growing of tree fruits at this station are published in the hope that they may prove of value to intending planters in this and similar sections.

In 1897 there was planted by this department an orchard consisting of 280 apple, 120 pear, 120 plum, and 80 cherry trees. Three trees each, of 182 varieties, were planted, but the numbers have since been very much reduced by the severity of the winters, added to the unfavorableness of the soil and site.

Practically all the sweet cherries have been destroyed, and Richmond, Montmorency, and Dyehouse are the only sour ones of value remaining. These latter are rapidly decreasing in numbers.

The only plum worth planting in this section, according to the results of this test, is Glass Seedling. It has not sun-scalded and seems to stand the winter without injury. The American plums are, of course, hardy, but the fruit is so little valued that they should not be planted where any other sort can be grown.

Flemish Beauty seems to be the hardiest pear of any value, but is quite subject to sun scald, blight and scab. Bessemianka, a Russian variety, is very hardy and vigorous, but is worthless so far as fruit is concerned. It will be tested as a stock for top-grafting. It has not blighted. Clapp's Favorite has done fairly well, but it is subject to blight.

A fair proportion of the original eighty-five varieties of apples have made average growth. Some, like Baldwin, have killed out entirely and a large number have made but indifferent progress. Following are the total yields to date of individual trees of those varieties in the young orchard which have given the largest crops. The years in which appreciable quantities of fruit were first borne are also given. All were planted in the spring of 1897.

HEAVIEST YIELDING VARIETIES TO DATE IN YOUNG ORCHARD.

Variety.	Bore Fruit in	Total Yield.	Average per year.
Shackleford	1904	9.5 bus.	2.3 bus.
Trenton	"	9. "	2.2 "
Utter	"	8. "	2.0 "
Ben Davis	"	7.5 "	1.8 "
Gano	1903	7. "	1.4 "
Stark	"	6.5 "	1.3 "
Hurlbut	1904	6.5 "	1.6 "
Tolman Sweet	"	6. "	1.5 "
McMahon White	1905	6. "	2.0 "
Wealthy	1903	5.5 "	1.1 "
Pewaukee	1905	5.5 "	1.8 "

Shackleford, Gano and Stark all belong to the Ben Davis class or type, and these figures show plainly why so many trees of this class are being planted by Ontario apple growers. They produce good crops before many other varieties reach the age of profitable fruit-bearing. It is doubtful, however, if the extensive planting of these varieties is to be commended. Shackleford we would not recommend on any account because of its light color. Gano is very similar to Ben Davis, while Stark is a slight improvement on that variety in respect to quality. There is no doubt that these varieties when grown in large enough quantities to attract exporters are money makers, but for general planting their use should be discouraged. Trenton is a very promising and, where it has been tried, a very useful and profitable fall apple. Utter is a poorly-colored late fall variety. It is very susceptible to "Bordeaux injury," and on that account also is not desirable. Hurlbut has little to recommend it. McMahon and Tolman are very hardy varieties and are adapted only to those sections where extreme hardiness is a necessity.

It will be noticed that Spy, Snow, McIntosh, Golden Russet, and other standard varieties are not included in the above list. They have not come into full bearing as yet. Eleven years is a comparatively short period in the lifetime of an apple orchard, but planters should consider the distant as well as the near future in making selection of varieties. A study of the older planting of apples on the College farm gives more reliable results and shows the necessity of looking at a question of this kind from all sides. About twenty years ago three acres of the present orchard were planted to apples. Some of these still standing are, as nearly as we can ascertain, twenty-two years of age. Many are at least eighteen years old and some few were planted still more recently.

The following table gives the number of trees of each variety and the total and average yields per tree for the five years, 1903 to 1907 inclusive. Most of the varieties have, we think, demonstrated their right to be classed as hardy in this locality. Spy is not usually classed as such but we have no more healthy and productive trees than certain of our Spys. The Wallbridge trees are all in a decrepit state, as a probable result of recent winter injury, as are also occasional specimens of other varieties. Those varieties apparently most vigorous and hardiest are designated by an asterisk:

AVERAGE YIELD OF VARIETIES IN OLD ORCHARD FOR THE LAST FIVE YEARS.

Variety.	Number of trees.	Total Yield per tree for five years.	Average Yield per tree for five years.
*Salome	1	28.5 bus.	5.7 bus.
*Spy	7	27.7 "	5.5 "
*Yellow Transparent	4	16.5 "	3.3 "
Ben Davis	1	15.0 "	3.0 "
*Alexander	4	12.9 "	2.5 "
*Wealthy	5	12.5 "	2.5 "
Gravenstein	1	12.0 "	2.4 "
*Duchess	6	11.7 "	2.3 "
Wallbridge	11	10.5 "	2.1 "
*Bellflower	4	10.5 "	2.1 "
*Snow	9	9.9 "	1.9 "
*Astrachan	2	9.5 "	1.9 "
*Colvert	2	9.2 "	1.8 "
*Golden Russet	3	7.0 "	1.4 "
*St. Lawrence	5	5.8 "	1.1 "
Haas	1	5.0 "	1.0 "

The figures show that Spys, if planted thirty-five feet apart, would produce sixty-four barrels per acre per year. Wealthy planted at twenty-five feet, which would be a fair distance in this section, would yield fifty-eight barrels per year per acre. It will be noticed that Salome is credited with the largest yield per tree per year. Only one tree of this variety has been tested, and these results consequently cannot be taken as conclusive. The best records for individual tree performance is held by Spy, three trees of which have given a total yield for the five years of forty-seven and three-quarters, thirty-six, and thirty bushels respectively. Average results are secured only by testing a number of trees of each variety, and only in those cases in which several trees are reported on should the results be taken as at all representative of the possibilities of the variety.

STERILITY AND PARTIAL FERTILIZATION OF APPLE BLOSSOMS.

Investigations conducted in this department in 1905 and 1906 by *Mr. G. E. Sanders, B.S.A., have thrown considerable light on certain economic problems intimately connected with orcharding. Certain varieties of fruit. Northern Spy, for instance, are known to be altogether unable to fertilize their own blossoms and produce fruit if planted by themselves. This condition is called "Self-sterility." In addition to this another condition is recognized called "partial" or "imperfect fertilization," in which a part only of the carpels or ovules of the fruit become properly impregnated.

The cause of this latter condition is an insufficient supply of suitable pollen. It results in smaller fruit, greater liability to attacks of scab and a much heavier loss by dropping throughout the growing season.

Smaller fruit is, as a rule, known to be also the result of self-fertilization, even in the case of those varieties which are known to be able to fertilize their own blossoms successfully. It is pointed out that larger fruits usually result if cross-fertilization with some other variety takes place. In the light of these facts, it becomes of great importance for the fruit-grower to study carefully the causes and remedies for these peculiar conditions.

The remedy for self-sterility is, obviously, mixed planting with varieties which bloom at the same time. Given a proper selection of varieties, the evils of self-fertilization and imperfect fertilization may also be overcome by making the conditions as favorable to cross-fertilization as possible. Careful experiment has shown that practically all the labor of cross-pollination is performed by bees. If these are not numerous enough, they should be supplied, and experience has proven that beneficial results often follow the introduction of a few hives of bees into the vicinity of orchards.

Mr. Sanders also points out that trees not allowed to overbear were better able to mature imperfectly fertilized fruits than were overloaded trees. It would seem wise, therefore, not only to thin the fruit, but also to nourish and strengthen the trees by cultivation and in every other way possible.

For the guidance of planters, Mr. Sanders compiled a table giving the relative blooming periods of all varieties tested and also the results of his tests for self-sterility. Following are extracts from the compilation relative to the characteristics of the leading commercial varieties. The dates of blooming were noted in 1904 and may be taken as indicating approximately the relative blooming period of each variety. So far as the writer is at present aware the varieties marked by an asterisk have always been found self-sterile. The results of sterility tests conducted in 1907 are added as supplementary to the results obtained and compiled by Mr. Sanders.

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*See Mr. Sanders' graduating thesis on this subject, presented in this department in 1907.

Relative Blooming Periods and Results of Tests of Self-Sterility of Apples.

——	Found self-fertile in					Found self-fertile elsewhere.	Began to bloom in 1904.
	1903	1904	1905	1906	1907		
Duchess			1	1	1		May 26
Golden Russet						1	"
Wealthy		1	1	1	1		"
Snow				1	1	1	"
Yellow Transparent						1	"
Scott's Winter			1	1	1		"
*Winter St. Lawrence							"
Wagener			1				"
Astrachan						1	May 27
*Ben Davis							May 28
*Gravenstein							"
Fallawater						1	"
*McIntosh							"
*Pewaukee							"
*Blenheim							"
Tolman						1	May 29
Cranberry (not tested)							"
Alexander						1	"
Baxter (not tested)							"
Ribston			1				"
Wolfe River (not tested)							"
*Spy							"
McMahon White			1		1		"
Trenton			1				"
Stark						1	May 31
*Gano							"
Ontario	1		1				"
*King							"
R. I. Greening	1		1				June 1
Colvert			1	1			"
Hubbardston			1				"
Baldwin	1						

The blooming season usually lasts from six to eight days, depending somewhat on weather conditions.

Sterility tests were also conducted in 1907 with many varieties of pears, cherries and plums. All the plums tested were found to be self-sterile, but Flemish Beauty pear and Dyehouse cherry both tested strongly self-fertile.

Spraying.

For an account of an experiment conducted in this department with kerosene emulsion for the control of the Oyster Shell Scale, and for other information on spraying, see the Report of the Professor of Entomology.

Small Fruits.

The results of the variety tests with strawberries and bush fruits which have been in progress for a number of years, are not subject to any important change this year. The list of recommended varieties may be found in previous reports.

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*The varieties marked with an asterisk have invariably proved self-sterile.

VEGETABLE GARDENING.

Vegetable gardening is now becoming one of the important industries of this country. Naturally it is carried on most extensively in proximity to the larger towns and cities, although in many rural sections certain truck crops are grown on a large scale and shipped to all parts of the country. About ten acres are devoted here to the growing of vegetables. Careful tests have been made during the past two years with a great variety of truck crops.

Variety tests necessarily require first attention, because the difference between success and failure in the growing of these crops often lies in the selection of the right varieties. When we have determined by careful tests what are a few of the best among the scores of varieties listed in seedsmen's catalogues, we hope to take up the improvement of varieties by selection and methods of cultivation.

Mr. A. McMeans, foreman in this branch, has recorded the data for the following report on this work:

BEANS. The variety test of garden beans included seventy-one varieties. Thirty-seven of these were what are known as golden-podded or wax beans, and thirty-four were green podded.

Of the golden-podded varieties the following were among the best:—Keeney's Rustless Golden Wax, Pencil Pod, Golden Wax, Wardell's Kidney Wax, and Golden Queen.

Of the green-podded varieties the best were, Red Valentine, Full Measure, Giant Stringless Green Pod, Refugee Round Pod, and Tennessee Green Pod.

BEETS. Sixty-six varieties of table beets were tested, forty-seven of which were classed as turnip-rooted and nineteen were of the long or half-long class.

Of the turnip-shaped varieties the following were a few of the best:—Eclipse, Detroit Dark Red, Dewing's Blood Turnip, Columbia and Early Model.

Black Prince and Black Red Ball are excellent as late varieties for winter use, but are rather slow growers for early use.

Of the long varieties Dobbie's New Purple was one of the best.

CARROTS. Among the thirty-one varieties of table carrots under test the best were Chantenay, Rubicon and Danvers. Rubicon is a new variety of the Chantenay type and proved to be one of our heaviest yielders.

CABBAGE. Among the sixty-four varieties tested, the following stand out as a few of the best to cover the season from early to late:—Jersey Wakefield, All Head, Early Summer, All Seasons, Danish Ball Head and Flat Dutch.

Of the newer sorts the following are the most promising: Alpha. Eureka, Glory of Enkhousen, Diamond Winter, Danish Round Head, and Houser. The last named has proved less susceptible to rot than any cabbage we have grown.

Among fourteen varieties of Savoy cabbages tested the best were Ironhead, Drumhead, and Perfection (Sutton). The first is early maturing while the other two are later. The Perfection is very finely netted, of attractive appearance and good quality.

Among the twelve varieties of red cabbage tested there was none better than the old standard Mammoth Red Rock.

CELERY. Celery has been grown here for many years in large quantities and a number of varieties have been tested. Those which have given the best results are White Plume, Paris Golden Yellow, Giant Dwarf White, and Triumph. These are given in the order of season. The most promising new variety is Chicago Giant Self-Blanching. This resembles White Plume, but is a somewhat stronger grower with larger, thicker stalks of a rather better flavor.

ONIONS. Forty-two varieties of onions were tested this year and fifty-five the year before. Among all this number there are none better than the old standard varieties we have been growing for years, viz., Yellow Globe Danvers, Prizetaker, and Red Wethersfield. Of the newer kinds the most promising are Ailsa Craig, Gibraltar, and Golden Globe.

PEAS. A test was made this year of ninety-four varieties of garden peas. These vary greatly in season and length of vine. In the following list are given a few of the best early, mid season, and late varieties, with record of average length of vines.

Among the earliest kinds were Alaska, Extra Early, First of All, Lightning, and Extra Early Pioneer. These were all very much alike in earliness, productiveness, and size of peas and pods, vines 20 to 24 inches long.

Among the best of the mid-season varieties were, Gregory's Surprise, 24 to 30 inches; Nott's Excelsior, 15 to 17 inches; Ideal (Sutton), 30 to 36 inches; Gradus, 28 to 35 inches; Wm. Hurst, 12 to 14 inches. These produce larger and finer peas than the earlier kinds.

The best of the late peas were Stratagem, 24 to 30 inches; Dwarf Defiance, 22 to 24 inches; Heroine, 30 to 36 inches; Shropshire Hero, 26 to 32 inches; Cooper's Prince Edward, 34 to 36 inches; Hurst's Reliance, 44 to 48 inches; Horsford's Market Garden, 24 to 28 inches. The latter gave an average yield of sixteen pods per plant with an average of over five peas per pod.

TOMATOES. Extensive variety tests with tomatoes have been made here for the past twelve years, but, as a rule, only the earliest kinds mature a full crop in our comparatively short and cool summer season at Guelph. This year seventy-three varieties were included in the test. Eight plants were grown of each variety. The plants were set out in the field on June 11th; the first ripe fruit was picked on August 17th, and the last picking was made on October 2nd.

The following table gives the results from twenty of the heaviest yielding varieties:

HEAVIEST YIELDING TOMATOES.

Name of variety.	Number of fruits 1st picking.	Average weight of fruit per plant.	Average number of fruits per plant.	Average weight of individual fruits.
		Ounces.	Ounces.	Ounces.
Nolte's Earliest	22	373.6	75.8	4.9
Quicksure	11	335.5	51.8	6.4
Early Hustler	12	318.5	59.0	5.3
Supreme Early	13	313.1	50.8	6.1
Wealthy (College)	10	312.6	51.7	6.0
Earliest of All (Vaughan)	32	306.3	111.0	2.7
Wealthy (Bolgiano)	16	305.2	57.0	5.3
Big Victor	5	297.1	54.6	5.4
Dominion Day	10	296.1	49.8	5.9
Earliana (Robertson)	20	295.7	69.7	4.2
King of the Earliest	16	295.3	56.7	5.2
Atlantic Prize	7	291.2	51.2	5.6
Earliest Pink	17	274.3	44.0	6.2
Mikado	6	273.6	30.6	8.9
June Pink	11	272.6	44.0	6.1
Early Ruby	9	261.2	47.2	5.0
I.X.L.	10	247.2	44.7	5.5
Express	12	247.2	47.5	5.2
First of All (Rennie)	9	246.0	41.3	5.9
Earliana (Johnson)	8	237.1	43.2	5.4

From a study of the foregoing table it might be supposed that it included all of the best varieties of tomatoes; as a matter of fact, it includes only the earliest varieties which naturally give the heaviest crop in localities like this and more northern sections where the summer season is comparatively cool and short. The table, therefore, is valuable in showing what varieties are likely to give the best results where earliness is a prime factor.

Taking all things into consideration, we have found Wealthy one of the best varieties on this list. It is early and productive. The fruit is uniformly of nice shape, medium size, firm and of good quality.

For southern sections where the later and usually better varieties of tomatoes can be depended upon to mature a full crop, we would recommend the following to cover the season from early to late, Wealthy, Chalk's Jewel, Stone, and Success.

FORCING HOUSE EXPERIMENTS.

The forcing of vegetables under glass in winter is a phase of the market garden industry which has made great progress during the past five years in many parts of Ontario. After the rebuilding of our greenhouses last year, we were able to devote two houses to vegetable forcing. A brief summary is here given of some of the experiments undertaken with a number of the crops usually grown under glass.

LETTUCE. In a test of sixteen of the varieties of lettuce commonly recommended for forcing purposes, the old standard variety known as Grand Rapids proved best both for yield of crop and suitability for market. Golden Queen, a newer variety, was of the best quality, but was too small and slow of growth to be profitable.

RADISHES. In a test of eighteen varieties of radishes the following gave the best results under forcing house conditions: Non Plus Ultra, Rosy Gem, Scarlet Turnip, and White Tip Scarlet Turnip.

With the radish crop a comparison was made between the ordinary seed as purchased from the seedsman and the large plump seed taken from the same sample by screening out the smaller seeds. The results, as shown by the evenness and vigor of the crop, were very marked in favor of the large plump seed.

WATER CRESS AND PARSLEY. These crops placed in the coolest section of one of the forcing houses gave a continuous yield of crisp, tender leaves throughout the whole winter and were in great demand for relishes and garnishing.

FORCING CUCUMBERS. In the greenhouse used for radish and lettuce during the winter, cucumbers were grown as a spring and summer crop. A test was made of a number of the large varieties usually known as English or forcing cucumbers.

The first fruits were picked on July 8th and good pickings were secured until August 15th. Among the varieties that gave the best results were the following:

YIELD OF FORCING CUCUMBERS.

Name of variety.	Average fruits per vine.	Average weight of fruit.
Prizewinner	29	36.68 ozs.
Delicacy	27	33.76 "
Telegraph	26	31.26 "
Matchless	24	32.91 "
A1	23	30.67 "
Everyday	22	30.58 "
Satisfaction	19	34.50 "

FORCING TOMATOES. One greenhouse was devoted wholly to experimental work in forcing tomatoes. The tests included a comparison of varieties most suitable for greenhouse culture; planting at different distances apart; training to one or two stems; surface watering and sub-irrigation; and fumigating with hydro-cyanic gas for the white fly.

The following table shows the comparative yields of the different varieties trained to single stems on the sub-irrigated and surface watered beds:

YIELD OF TOMATOES IN FORCING HOUSE.

Name of variety.	Sub-irrigated.			Surface watered.		
	Average weight of fruit per plant.	Average number of fruits per plant.	Average weight of fruit.	Average weight of fruit per plant.	Average number of fruits per plant.	Average weight of fruit.
	Ounces.		Ounces.	Ounces.		Ounces.
1. Livingston's Beauty....	195.6	26	7.43	110.6	13	8.51
2. A. 1	176.0	46	3.68	124.6	29	4.25
3. Lester's Prolific........	172.5	51	3.38	111.3	39	2.79
4. Frogmore	160.5	50	3.21	149.0	35	4.17
5. Chalk's Jewel	156.3	22	6.89	131.6	27	4.87
6. Ignotum	142.6	21	6.79	129.3	16	7.76
7. Select Stone	136.0	22	6.00	120.0	20	6.00
8. Rochford	132.3	31	4.26	148.3	31	4.78
9. Best of All..............	132.0	36	3.66	131.6	44	2.94
10. New Stone	131.6	24	5.48	100.6	18	5.59
11. Combination	123.0	24	5.12	99.0	20	4.79
12. Magnus	122.6	18	6.69	93.6	10	8.78
13. Noble	119.0	20	5.95	103.6	15	6.61
14. Lorillard..............	117.6	24	4.77	107.0	19	5.53
15. Faultless Early	115.0	25	4.60	121.0	19	5.97
16. Earliest of All..........	109.0	31	3.51	119.0	28	4.25
17. Winter Beauty	107.6	34	3.16	105.0	30	3.42
18. Comet	107.6	35	3.07	101.0	41	2.46

The foregoing table shows the relative productiveness of the varieties in the test, and also the average size of the fruits; but it does not show the smoothness, color and quality of the fruit, very important features in greenhouse tomatoes. Taking all things into consideration, Lester's Prolific was one of the best varieties in the test, and Chalk's Jewel made a good second. Livingston's Beauty, although it gave the heaviest yield, produced fruits too large and rough for a good forcing variety.

SUB-IRRIGATION AND SURFACE WATERING.

The sub-irrigated bed was watered by means of tile placed on a cement bottom under the soil so as to carry the water to all parts of the bed, from where it was taken up by the soil and plant roots above. The surface watered bed was watered in the ordinary way by the hose on the surface of the soil. The results as indicated in the above table show that all but three of the eighteen varieties in the test gave heavier yields on the sub-irrigated bed. The total increase of yield of the sub-irrigated over the surface watered bed was 338.5 ounces, or an increase of 6.3 ounces per plant.

SPACING AND TRAINING TOMATOES IN FORCING HOUSE.

A test was made to find out at what distance apart tomato plants should be set in the bed to give the best returns, and also what effect training to single and double stems would make at the various distances.

The following table gives the results with plants set at one foot, one and one-half, and two feet apart, on both surface watered and sub-irrigated beds:

SPACING AND TRAINING TOMATOES.

Distance apart, feet.	Sub-irrigated.				Surface watered.		
	Number of stems.	Number of fruits per plant.	Weight of individual fruits.	Weight per sq. ft. of bed.	Number of fruits per plant.	Weight ot individual fruits.	Weight per sq. ft. of bed.
			ounces.	ounces.		ounces.	ounces.
1 x 1	1	20.5	2.77	56.02	16.1	3.65	54.46
1½ x 1½	1	34.6	3.21	49.09	23.1	3.63	37.23
2 x 2	1	35.4	3.66	32.22	28.3	4.73	30.58
1½ x 1½	2	39.7	2.88	50.56	32.7	3.60	49.45
2 x 2	2	49.0	3.32	38.36	36.6	4.17	35.04

From this it will be seen that the close planting gave the heaviest yield per square foot of bed, but that at the same time there was a decrease in the size of the fruits. It will be noticed, too, that the plants trained to two stems at both one and one-half and two feet apart, gave a greater yield per square foot of bed than where trained to a single stem at these same distances.

FUMIGATING FOR WHITE FLY.

The white fly (*Aleyrodes vaporariorum*) gave serious trouble in the tomato house during the early part of the season, but was finally subdued by fumigating with hydrocyanic gas. For a full account of the plan adopted in using this gas, see the floricultural section of this report on page 150.

FLORICULTURE.

The following report on the floricultural work of the department has been prepared by Mr. William Hunt, Instructor in Floriculture, who has ably taken up this growing section of the work.

The constantly increasing demand for more information and enligtenment on all matters pertaining to floriculture proves conclusively that this branch of horticulture is being more generally practised and is becoming more universally popular every year. Not only is this the case with the regular classes of College and Macdonald Institute students, but also with the various classes of Nature Study students who have attended the College during the past three or four summer terms. These last named classes were composed mainly of school teachers, including inspectors and principals, from all parts of the Dominion. In almost every instance the request was made by them for additional lectures and practical instruction on floriculture, which request was complied with so far as the limited time at their disposal would allow.

TEACHING AND DEMONSTRATION WORK.

Macdonald Institute Classes.—A series of twenty-four lectures on floriculture was given by me to the ladies' class taking the horticultural option in both the fall and winter term classes, in all about fifty lectures. Practical demonstrations were given with most of these lectures, the practice work in connection therewith being afterward carried out by the students themselves in the laboratory at the close of the lecture.

Second Year Students. The '06-7 class of second year students was the largest in the history of the College. Twenty lectures in all were given to this class of ninety students during the winter term, the lectures and practical work being along lines that would be useful in floriculture pertaining to the beautifying of the home.

Fourth Year Students. Sixteen lectures with a large amount of laboratory and practical work in advanced features of floriculture both from an amateur and commercial standpoint were given to those students specializing in horticulture. There is a growing demand for a more extended course of instruction in commercial floriculture by our students.

Nature Study Classes. Fourteen lectures with as many demonstrations and as much practical laboratory work as possible were given the classes in Nature Study. Much interest was shown in the work, more especially in the practical propagation of plants, bulb culture, and out-door gardening.

OUTSIDE LECTURES.

In addition to lectures to students, I have delivered lectures on different phases of floriculture to various Horticultural Society meetings throughout the Province at the following places:—Toronto, Owen Sound, Stratford, Grimsby, Woodstock, Tillsonburg, and Port Dover, and at the Marden Women's Institute. At most of these places I addressed gatherings of school children at the schools in the afternoon. This latter feature of the outside work is one of the most pleasing—and I believe profitable—features in connection with my lecture trips.

JUDGING AT HORTICULTURAL SOCIETIES' EXHIBITS AND FALL FAIRS.

During the past year I acted as judge at the annual exhibits of the Fergus, Owen Sound, Stratford, Elmira, St. Catharines, Tillsonburg, Elora, Galt, and Brantford Horticultural Societies, as well as at the Guelph Central and North Grey (Owen Sound) Fairs. The floral exhibits made by school children at many of these shows was the most appreciated feature of the exhibits.

Numerous articles on floriculture have been contributed throughout the year to horticultural and other papers, a large number of questions have been answered both in periodicals and through the mail. The main idea in connection with all of the foregoing phases of educational work has been to give such information and instruction as would be helpful in making the home surroundings what they should be, bright and cheerful.

THE GREENHOUSES.

The largely increased number of students and classes taking up floriculture have taxed the two greenhouses now devoted to floriculture to their utmost limit. It is found necessary each year to devote more space to laboratory work, and to growing plants more particularly suited for class instruction and practical work by the students. This leaves very little room for experiments and tests except along amateur lines.

FUMIGATION WITH CYANIDE OF POTASSIUM FOR WHITE FLY.

The recent visitation of the insect known as the White Fly (*Aleyrodes vaporariorum*) in the greenhouses gave a good opportunity for tests for the eradication of this pest. This fly has caused much trouble, and often serious loss to all kinds of greenhouse plant growth—whether of vegetables or flowers—throughout the Province during the past three or four years. The adult fly is easily recognized not only by its minuteness but by its pure white shining appearance. The mature fly as well as the eggs and pupa are found on the under side of the foliage. It increases very rapidly, and is particularly fond of Salvia, Ageratum, Pelargonium, Geranium, and many other window and greenhouse plants. Fumigating or spraying the plants with nicotine preparations or with soap or kerosene emulsion have no decided effect upon it. Fumigating with cyanide of potassium seems to be the only thorough and effective means of exterminating the White Fly. As the fumes of cyanide of potassium are very deadly in their character to all animal life, great care must be taken by those using the cyanide not to inhale any of them. Cyanide should be used only in greenhouses and is not safe to use in the home of the amateur flower grower. Very varied results have been obtained in the use of this chemical, oftentimes owing to the varied strength of the cyanide itself. The most satisfactory results were obtained by using the ninety-nine per cent. chemically pure cyanide, as the ordinary or more crude cyanide varies so much in strength. Weather, atmospheric conditions, temperature and sunlight, tight or dilapidated greenhouses, all have more or less influence on results in using cyanide. The length of time the plants are exposed to the fumes is another important factor in results. In various tests made it has been found that it is not possible to use the cyanide of sufficient strength to destroy the eggs and pupa of the fly without injuring more or less some kinds of plant growth.

The Pine Apple Salvia, *Pilea microphylla*, (Artillery Plant), Tradescantia zebrina, Ageratum, and very young tender seedlings are some of the plants that are most readily injured by fumigating with the cyanide, with even very light fumigations. The plants mentioned should be removed from the greenhouse before fumigating operations begin. The green Tradescantia appears to be more resistant to the fumes than the dark leaved varieties, as in several tests the green variety was uninjured. Many other greenhouse plants, such as ferns, palms, and even pelargoniums, geraniums, and fuchsias, in full flower have not been injured in the slightest by light fumigations that have proved fatal to all of the mature or adult flies.

The following quantities of cyanide of potassium, sulphuric acid, and water to every one thousand cubic feet of greenhouse space have been found effective in killing the adult or mature fly under ordinary greenhouse conditions, without injury to plants save those mentioned. —

¼ ounce of chemically pure (99% pure) cyanide of potassium.
½ " sulphuric acid.
1 " water.

The following are the main points to be taken into consideration before starting to fumigate:—

1. Measure the greenhouses to ascertain the cubic feet of space in each house, and the quantity of materials required for each.

2. Make the houses as air-tight as possible by closing ventilators and other apertures, except the door for exit, leave the latter partly open until fumigation begins.

3. Fumigate late in the evening just before darkness sets in and when there are no strong winds prevailing.

4. Never fumigate in bright sunlight.

5. Temperature of greenhouse should not be over 60°F.

6. Provide sufficient suitable dishes in which to combine the chemicals. Flat, glazed, earthenware jars about six inches deep and eight inches in diameter are best for the purpose. Iron or tin dishes should not be used.

7. Carefully measure out the ingredients necessary for each jar to be used. For convenience in handling, the cyanide for each jar should be put into a small paper bag.

Method of Using. Place the jars on the walks in the house not more than fifty feet apart, to insure equal distribution of the fumes. Pour into each jar the quantity of water and acid required, dividing equally the materials required for the whole house among the number of jars used in it. Then begin at the jar farthest from the door and empty into it the cyanide, as previously measured out. Get away from it as quickly as possible, being careful not to inhale any of the fumes that begin at once to rise. If more than one jar is used treat the others in like manner as quickly as possible, and then get out of the house, close the door, and keep out until the next morning when the fumes will have become more or less dissipated. As a precaution, however, the doors should be opened for a few minutes in the morning to allow the fumes left to escape before anyone enters the house. Any cyanide left undissolved in the jars should be buried, as it is of no use again for fumigation purposes and it is dangerous to leave it lying around. Cyanide of potassium should be kept closely sealed in glass or glazed jars to prevent evaporation and loss of strength. Both the cyanide and the sulphuric acid should be kept out of reach of children or animals, and the jars or bottles in which they are kept should be labelled "Poison."

A number of tests were made with smaller quantities of chemicals than those mentioned, but with unsatisfactory results. Larger quantities with less time of exposure to plants were also tried with unsatisfactory results. In one test where double the quantity of chemical was used with a twenty-minute exposure, it was found that after a few hours many of the flies which appeared dead at first had recovered from the effects of the fumes and were quite lively, and some of the more resistant or hardy plants were slightly injured. The most satisfactory results on several occasions have been with the formula given and an all-night exposure. To entirely rid a greenhouse of these little pests, it will be found necessary to give three or four fumigations, about eight or ten days apart. The first fumigation destroys the adult fly and the second and successive fumigations the young ones that develop from the pupa and eggs which are unaffected by the fumigation.

Fumigations with cyanide of potassium are not effective on the Green Aphis, Black Aphis, Red Spider, Mealy Bug, Thrip or Scale. Fumigating with Aphis Punk we have found to be the most effective and cheapest means of exterminating the Green and Black Aphis.

Amateur flower growers who cannot fumigate their plants with cyanide may, to a large extent, prevent attacks of the White Fly by syringing or spraying the under side of the foliage with soapy water once or twice a week, and when the plants are nearly dry dust them with finely powdered flour of sulphur, wood ashes, or soot. The applications must be made to the under side of the foliage to be effective.

THE FLOWER BEDS AND BORDERS.

The perennial, or, to be more strictly accurate, the mixed border stocked with permanent plants suitable for the farm or city flower garden was a source of much interest and attraction during the June excursions and throughout the summer season. Many new varieties, hybrids, and species, have been added to this border during the last few years. It is very evident from the interest shown that this feature of flower gardening is rapidly becoming more popular. A little bulletin on "The Mixed Flower Border" has been prepared, giving information as to the best species and varieties as well as hints on their care and culture. Copies can be had at any time on application to Prof. H. L. Hutt, Horticultural Department, Ontario Agricultural College, Guelph.

THE ANNUAL BORDER.

Upwards of eighty varieties of annuals were tested in the annual border this season. This feature of floriculture is of great benefit to students and visitors, giving an opportunity as it does of comparing closely the merits or demerits of different varieties, as well as being useful for purposes of identification. Some good object lessons could also be seen in several species as to the necessity for careful selection of seeds. In some instances plots gave very desirable results whilst other plots of the same variety sown with seed from a different source produced flowers of very inferior quality, often not worth growing.

Among the many varieties of annuals tested were some promising new ones which showed signs of being valuable acquisitions to the list of these popular summer flowers. The new annual Sweet William—a hybrid between the China Pink and the ordinary Sweet William—gives promise of being a very useful addition to this class of plants. Plants from seed grown on May 22nd in the open border were in flower the second week in July and flowered continuously until after the first early frosts. The ever-blooming Sweet William sown on the same date gave equally good results. The new type of Nigella or Love in a Mist (Miss Jekyll) is also a decided advance on the original type of this old-fashioned favorite. Zinnia elegans, Lilliput, or Dwarf Zinnia, growing to a height of about twelve inches with much smaller flowers and less coarse than the old type of Zinnia will prove useful for a flower bed or for sowing in clumps or groups in the border. The Annual Chrysanthemum (Yellow Marguerite) "Evening Star," is a very floriferous annual, its pale yellow flowers being much appreciated during the early part of the summer. Schizanthus Wisetonenis (Butterfly Flower) is a great advance on the old type of these flowers, its delicately formed sprays are very graceful and enduring for cut flower purposes. The annual Gypsophilla is deserving of more general cultivation because of its continuous and free flowering habit and also because of its value in cut flower work. The plumed varieties of Celosia (Coxcomb), both the crimson and golden, are very useful for decorative purposes in the border or as cut flowers.

Owing to the late season the annuals could not be sown this year until about the third week in May. Usually about the first week in May is the best time to sow most annuals out of doors for early bloom. Later sown annuals, sown in the mixed border often give a wealth of blossoms at a time when many of the perennials are past blooming and begin to look shabby.

ROSE TEST. About one hundred and forty varieties of roses representing the different types were planted last spring, in order to determine what are the hardiest and best kinds for the amateur. Tests of the best methods of winter protection will be made during the present winter, and tests of cultural methods and various kinds of insecticides will also be made upon them next season.

Pæony Test. One hundred plants of these increasingly popular summer flowers were planted this fall. The Pæony is rapidly coming to the front as one of the main summer flowers for commercial and amateur culture. We hope soon to include in our collection all of the best known varieties.

Continued selections were made this year with Chrysanthemums, Gladioli, and seeding geraniums, the latter being the result of cross fertilization work done by students upon a number of the standard varieties of geraniums. Several of these seedling varieties promise to be of unusual merit, but these will have to be still further tested before their value can be definitely determined.

LANDSCAPE GARDENING AND RURAL ART.

There never was a time in the history of this country when so much interest has been manifested in the ornamental or aesthetic side of horticulture—what might be called landscape gardening and rural art. It is quite natural, however, that as the country becomes settled, and particularly in times of prosperity such as we have enjoyed of late years, that the people should give more thought to the improvement and beautifying of their surroundings. Such desires and aspirations deserve all the encouragement we can give, for they tend to the general improvement and uplift of our people.

Educational Agencies at Work.

There are a number of educational agencies at work in this Province promoting an interest in rural art and civic improvement. Among the most active of these is the Ontario Horticultural Association, with which is affiliated sixty-six local horticultural societies in various parts of the Province. The enthusiasm shown at the second annual meeting of this Association recently held in Toronto was good evidence that it is going to exert a powerful influence for good throughout the country.

The press, too, is taking a more lively interest than ever in such matters, and is proving a strong factor in advancing this desirable work. At the request of the *Farmers' Advocate,* we contributed a series of four articles last spring on "The Improvement of Rural Home Surroundings," which has lead to a number of inquiries for more information on the same subject.

Beautifying of School Grounds.

In our opinion one of the most effective means of creating a love for the beautiful would be to educate the rising generation by beautifying the school grounds of the Province. If the school grounds were made beautiful with trees, shrubs, vines and flowers, the effect would be far-reaching in its influence, not only with the rising, but with the present generation.

Already many school boards, both in town and country, are taking an interest in this matter and are making progress. At the request of the Board of Education, I prepared plans last summer for the beautifying of the Guelph Collegiate Institute grounds. The improvements suggested were undertaken at once, and much work has been done in grading and preparing the grounds for the seeding and planting which will be done next spring. Plans were also suggested for the improvement of a block of twenty acres in the town of Morrisburg in Dundas County, which is now used as High School grounds and is intended as well for a town park.

From correspondence we have had this year with school inspectors, teachers, and trustees, we believe there is a strong desire for such improvement and the introduction of school gardens in many sections of this country. We trust that before long our department here may be so organized that more attention may be given to this important work.

Civic Improvement.

Wherever citizens become alive to the importance of beautifying private grounds, the interest soon spreads to the improvement of streets and boulevards, and to the establishment of parks and improvement of public grounds. In a number of Ontario towns and cities, Park Commissions have been appointed which give greater continuity and permanency to the work of improvement.

At the request of the Parks Committee of the Guelph City Council, I have assisted during the year in planning for the improvement of the new Lyons Park donated to the city. Such improvements pay well in any community not only in providing healthful recreation and comfort for the people, but in advertising it as a desirable place for others to locate.

The College Grounds.

There can be no doubt that our spacious lawns and well kept grounds at the College, which are visited by thousands of visitors every year, have had a wide influence in creating a desire for improvement in private and public grounds throughout the country.

These grounds were originally laid out by a prominent American landscape architect, and while they may be considered too extensive to be imitated by private property owners, yet as we point out to our students, the same principles in grouping and planting adopted here may be taken as a guide in beautifying rural homes where the grounds need not be so extensive.

With the many new buildings which have been added here from time to time, the grounds have been enlarged and altered. Most of the permanent improvement made this year was in grading and laying out the grounds about the new Mechanical Building.

As foreman in this branch of the work, we are fortunate in having such a man as Wm. Squirrell, who has been here for thirty-three years. To him is due much of the credit for the neat and tidy condition of the grounds.

Instruction in Rural Art.

Instruction on landscape gardening as applied to the beautifying of rural and urban homes has been given to students of the Macdonald Institute, sophomore and senior years of the College.

A number of lectures on various phases of the subject have also been given during the year to Horticultural Societies throughout the Province.

Respectfully submitted,

H. L. HUTT.

PART XII.

THE PROFESSOR OF ANIMAL HUSBANDRY AND FARM SUPERINTENDENT.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit the report of my department.

During the year, my assistant, Mr. H. S. Arkell, resigned to accept the position of Professor of Animal Husbandry at the Macdonald College, Ste. Anne de Bellevue, Que. The loss of Mr. Arkell has been a serious one, as he had become thoroughly acquainted with the work of the department, and was doing exceptionally good work. We were very fortunate, however, in securing Mr. R. W. Wade as his successor. Mr. Wade is a strong man, and we believe that the effiicency of the Department will be fully maintained.

As in previous years, teaching in the College, attending Farmers' Institute meetings, stock judging classes, etc., directing the management of the farm and the experiments with live stock, and attending to many other matters, have combined to fully occupy my time. A detailed report of a great part of this work would not be of general interest, and, therefore, only those matters of greatest interest to farmers will be discussed.

FARM CROPS.

The past season, which has been so disastrous in many parts of the Province, gave us very fair crops. The cold weather of May interfered to some extent with the hay crop, which was not quite so heavy as usual, though it yielded close to two tons per acre. The fall wheat was a tremendous crop as regards straw, but a good deal of it lodged, which materially affected the sample and the yield. It is not all threshed, but will yield between thirty and forty bushels per acre. Oats were lighter in the straw than usual, and stood up well, which is an unusual thing for this farm. The sample is better than we have had for a number of years, and the yield will be at least fifty bushels per acre, though threshing is not completed. The barley was an exceptionally even crop, and should give a yield quite up to other years, though very little of it has been threshed. The root crop was quite satisfactory. Mangels are not quite so large as usual, but yielded about eight hundred bushels per acre, and turnips yielded seven hundred bushels per acre. The dry weather of July and August affected the yield of potatoes, which hardly reached one hundred and twenty bushels per acre. There was practically no rot among the potatoes this year. Silage corn was a very even crop, and yielded about fifteen tons per acre.

INVESTIGATIONS WITH SWINE.

The primary object in feeding live stock on the average farm is to furnish a profitable market for the products of the farm. The great advantage in feeding animals as a means of marketing farm products rests in the fact that the farmer is generally able to sell his grain, etc., in the form of animal products at prices which give him a fair profit above the cost of production, and to retain upon his farm a large part of the fertilizing value of his crops. This fertilizer increases the yield of subsequent crops, and by increasing the yield, reduces the cost of production. Even though he may sometimes realize slightly less than prevailing market prices for his crops, the fact that he produces his crops at a lower cost, gives him a larger profit than the man who sells his produce without feeding it to stock.

In another place will be found a discussion of prices realized for feed consumed by fattening steers, and this investigation deals with prices realized for feed consumed by fattening hogs.

SCOPE OF THE INVESTIGATION.

Part of the hogs employed in this investigation were fed at the College, and the remainder were fed by farmers in different parts of the Province, in the co-operative experiments rendered possible by the liberality of the Wm. Davies Co., of Toronto. The investigation takes in two hundred and ninety-seven hogs, weighing, when marketed, fifty-six thousand seven hundred and eighteen (56,718) pounds, or an average of 190.9 pounds each. Reliable figures from such a large number of hogs, fed under different conditions and at different seasons of the year, should prove instructive, and they are the only figures of the kind of which I have any knowledge. It may be added that two lots of hogs, which were fed under exceptional conditions, and consumed a very small amount of marketable food in consequence, have been omitted from the calculation. If they were included, the results would be still more favorable.

The following summary gives a clear idea of the scope of the investigation:

Number of hogs	297	
Weight when marketed	56,718	lbs.
Average weight per hog	190.9	"
Total meal consumed, including middlings and bran	165,911	"
Total skim-milk consumed	112,500	"
Total roots consumed	64,600	"
Miscellaneous foods, such as pasture, green foods, etc., valued by experimenters at	$77.00	

METHOD OF CALCULATING RESULTS.

The quantities of feed described above were consumed by the pigs after the time they were weaned. It becomes necessary, therefore, to assign a value to the pigs at weaning time. Since we assume that we are dealing with pigs raised by the man who fattened them, it is only fair that the pigs should be valued at what they cost at the time of weaning. In our experiments, as reported last year, the average cost of raising young pigs from birth to weaning, including service fee and cost of maintaining sow, was $1.27 each. Lest this amount may be considered too low, we are charging the pigs used in these experiments at $1.50 each, which should represent the maximum cost.

In the table which follows, it is assumed that the pigs are sold at prices varying from 4½ cents to 6½ cents per pound, live weight, and the prices obtained for food actually consumed are reckoned on the basis of each selling price.

The cost of the pigs when weaned ($1.50 each), the charges for miscellaneous foods amounting to $77.00, the value of the roots at 10 cents per bushel, and the skim-milk at 20 cents per hundredweight, are first deducted from the total proceeds in each case, and the residue represents the cash received for meal consumed by the hogs. The term meal includes middlings and bran.

The following table shows the prices obtained for feed under each valuation of the hogs when sold:

PRICES REALIZED FOR FOODS CONSUMED BY 297 HOGS.

Assumed selling prices of hogs, live weight.	Meal, including middlings and bran.	Milk.	Roots.
If sold at 4½ cents per lb.	$20.45 per ton.........	20 cents per cwt.	10 cents per bu.
" 5 " "	$23.87 "	20 " "	10 " "
" 5½ " "	$27.29 "	20 " "	10 " "
" 6 " "	$30.71 "	20 " "	10 " "
" 6½ " "	$34.13 "	20 " "	10 " "

Comments.

1. The results shown in the table mean, that after deducting the cost of the pigs at weaning time, and the charges for miscellaneous foods, the farmer would receive the prices indicated in the table for the foods consumed by the hogs. The prices received for foods vary, of course, with the price at which the hogs were sold. No charge is made for labor, and no credit is given for manure.

2. The kinds of meal used in feeding these hogs comprise barley, peas, oats, corn, middlings, and bran.

3. It has been necessary to group all kinds of meal together, owing to the fact that many of the experimenters could not give exact quantities of each kind of meal, and simply furnished total weight of mixtures.

4. Comparing the prices obtained for feed in these experiments, with prevailing market prices for feed in ordinary years, we must admit that even if sold at 4½ cents per pound, these hogs would return fair values for feed consumed, and at 5 cents per pound they would return more than ordinary market prices for feed consumed.

5. It is not often that hogs have sold at less than 5 cents per pound during late years, and since the usual price for hogs has been considerably above 5 cents per pound, we must conclude that selling farm products in the form of finished hogs is generally a profitable method of disposing of them.

6. While it is a bad thing for a farmer to be overstocked with hogs, yet there is an important place for hogs upon most farms, and especially upon those farms where dairy by-products are available.

FATTENING STEERS FOR EXPORT.

SHORT KEEP *vs.* LONG KEEP STEERS.

The terms *short keep* and *long keep* as applied to steers are not exactly definite, that is to say, it is somewhat difficult to draw the line between the two classes of steers, as they merge gradually one into the other. Generally speaking, however, short keep steers are heavy, fleshy steers, which can be finished for export with two or three months of stall feeding, while long keep steers are lighter and thinner, and may require five or six months of feeding in order to finish them.

Plan of Experiment. This experiment is a continuation of last year's work, and the aim is to secure data regarding the relative value of short keep and long keep steers. Eight steers were employed in each group, and particulars regarding the weights, etc., of each group will be found in the table which follows. The meal ration comprised barley, oats and bran, and while there was some variation in the proportions of these foods, the approximate proportions for the short keep steers were about two parts barley to one part each of oats and bran by weight. For the long keep steers a much larger proportion of bran was used at the start. The bulky fodder consisted of a mixture of one part cut hay, two parts pulped roots, and two parts silage by weight.

The short keep steers were started on about five pounds of meal each per day, which quantity was increased as rapidly as deemed safe until it reached about ten pounds of meal per steer per day. On the average, the steers consumed .632 pounds (not quite 2-3 of a pound) of meal per day per 100 pounds of their average live weight.

The long keep steers were started on about four pounds of meal each per day and increased very gradually. On an average, they consumed .524 pounds (a little over ½ pound) of meal per day per 100 pounds of their average live weight.

Valuation of Foods. For purposes of comparison, the same values were attached to foods consumed as were employed last year. To be sure, they are a great deal lower than prices prevailing at the present, but it must be remembered that the experiment was conducted during the winter of 1906-07, when prices for feedstuffs were much lower. In any case, it does not much matter whether the values used are high or low, as they answer the purpose of comparing the two classes of steers, which is the only object sought in the experiment. The values attached to food used are as follows: Meal, including bran, $20.00 per ton; hay, $8.00 per ton; roots, $2.00 per ton; silage, $2.00 per ton.

The following table gives general details of results:

TABLE SHOWING WEIGHTS, GAINS, FOOD CONSUMED, COST OF GAIN, ETC.

	Group I. 8 Steers. Short Keep.	Group II. 8 Steers. Long Keep.
Average weight of steers at commencement of experiment..........	1279.3 lbs.	1160.3 lbs.
Average weight of steers at close of experiment..........	1431.9 lbs.	1405.6 lbs.
	In 69 days	In 126 days
Average gain per steer	152.6 lbs.	245.3 lbs.
Average daily gain per steer..........	2.21 lbs.	1.95 lbs.
Food consumed..........	Meal — 4,730 lbs. Hay — 5,000 " Roots—10,000 " Silage—10,070 "	Meal — 6,780 lbs. Hay — 9,325 " Roots—18,625 " Silage—18,625 "
Value of food..........	$87.37	$142.36
Cost of 1 lb. increase in weight..........	7.15c.	7.25c.
Average meal consumed per day per 100 lbs. average live weight of steers..........	.632 lbs.	.524 lb.

Relative Value of the Two Groups. The table given above contains details which may be of general interest, but it does not touch the point at issue in the experiment, viz., the relative values of the two classes of steers used in the experiment. To arrive at this point, it will be necessary to affix arbitrary values to one group of steers, ascertain, by using these values, what prices were obtained for the food consumed, and from these data ascertain what could have been paid for the steers in the other group in order that they might be sold at the same price per pound, and return the same values for food consumel.

Suppose, therefore, that the long keep steers are valued at 4 cents per pound when purchased, and at 5 cents per pound when sold. This valuation gives a "spread" between the buying and selling price of only one cent per pound, which is a smaller "spread" than most feeders are satisfied with. Attaching these values we get the following:

Cost price 8 long keep steers, 9,282 lbs. at 4c.	$371 28
Selling price 8 long keep steers, 11,245 lbs. at 5c.	562 25
Money received for feed consumed	$190 97

That is to say, the total feed consumed by these eight long keep steers was sold for $190.97. Now, let us see what price per bushel, or per ton, was received for the feed. Approximately, the prices were as follows:

Barley	2,420	lbs. at 60c. per bu.	= $30.25
Oats	1,530	" 42½c. per bu.	= 19.12
Bran	2,830	" $25.00 per ton	= 35.37
Hay	9,325	" $12.00 per ton	= 55.95
Roots	18,625	" 10c. per bu.	= 31.04
Silage	18,625	" $2.00 per ton	= 18.63
Total			$190.36

This total is a few cents short of what was actually received for the feed consumed by the steers, but it may be regarded as practically correct. It will be noted, therefore, that by buying these steers at four cents per pound, and selling them at five cents per pound, the feed they consumed was sold at the following prices: Barley, 60c. per bu.; oats, 42½c. per bu.; bran, $25.00 per ton; hay, $12.00 per ton; roots, 10c. per bu.; silage, $2.00 per ton. The prices realized for feed are considerably above average market prices in this province, and the farmer who marketed his products at the prices realized in this experiment, should have a substantial profit.

Now, let us see what we could have paid for short keep steers, so that we could sell them at the same price per pound (5c.) as the long keep steers, and realize the same prices for feed. The problem works out as follows, the cost of feed actually consumed by this group being first ascertained:

Barley	2,300	lbs. at 60c. per bu.	= $28.75
Oats	1,260	" 42½c. per bu.	= 15.75
Bran	1,170	" $25.00 per ton	= 14.62
Hay	5,000	" $12.00 per ton	= 30.00
Roots	10,000	" 10c. per bu.	= 16.66
Silage	10,070	" $2.00 per ton	= 10.07
Total			$115.85

Selling price, 8 short keep steers, 11,457 lbs. at 5c.	$572 85
Value of feed at prices realized in long keep group	115 85
Price which could have been paid for short keep steers to realize same prices for feed as realized in long keep groups	$457 00
Weight of short keep steers when purchased, 10,235 lbs.	
Price per cwt. which could have been paid for short keep steers to get same results as with long keep	$4 46

That is to say, buying the short keep steers at $4.46 per cwt. and selling them at $5.00 per cwt., would return the same values for food consumed as would be obtained by buying the long keep steers at $4.00 per cwt. and selling them at $5.00 per cwt. In other words, if the long keep steers were worth $4.00 per cwt. to buy as feeders, the short keep steers were worth $4.46 per cwt. to buy as feeders.

Notes on Experiment.

1. A peculiar feature of this experiment is the fact that the short keep steers made slightly cheaper gains than the long keep. As a rule, the long keep steers make cheaper gains.
2. The slight difference in cost of gain had very little to do with the superior showing made by the short keep steers. The main factors in determining the value of these two groups, were the heavier weights and higher condition of the short keep steers at the time of purchase. For a full discussion of the influence of these two factors in steer feeding, see Annual Report of the College for 1906, page 160.
3. In the case of the steers used in this experiment, the short keep steers were worth 46c. per cwt. more than the long keep steers, to buy as feeders. It will be noted, however, that the long keep steers averaged 1,160 pounds each at the commencement of the experiment, and required feeding only 126 days. In weight and condition, therefore, they were above the general run of long keep steers, and had they been lighter at the commencement, the difference in favor of the short keep steers would have been greater.
4. The lighter and thinner the steer, the less he is worth per pound to buy as a feeder.
5. In calculating the prices received for feed consumed by the steers no charge has been made for labor, and no credit given for manure.

FEEDING STEERS LOOSE *vs.* TIED.

In this comparison, the tied steers are represented by the eight short keep steers employed in the experiment just described. In comparison with these, we fed four short keep steers in a loose box. These steers had been dehorned before they were purchased.

The method of feeding, and the foods employed, were the same as in the case of the short keep steers already described, and the values attached to the foods for purposes of comparison, are the same as those employed in the experiment with short keep and long keep steers.

The following table gives the principal facts in connection with the experiment:

TABLE SHOWING WEIGHTS, GAINS, FOOD CONSUMED, COST, ETC.

	Group I. 8 Steers. Tied.	Group II. 4 Steers. Loose.
Average weight per steer at commencement of experiment	1279.3 lbs.	1258 lbs.
Average weight per steer at close of experiment	1431.9 lbs.	1439.2 lbs.
Average gain per steer in 69 days	152.6 lbs.	181.2 lbs.
Average daily gain per steer	2.21 lbs.	2.62 lbs.
Food consumed	Meal — 4,730 lbs. Hay — 5,000 " Roots—10,000 " Silage—10,070 "	Meal —2,520 lbs. Hay —2,825 " Roots—5,650 " Silage—5,650 "
Value of food	$87.37	$47.80
Cost of 1 lb. increase in weight	7.15c.	6.59c.
Average meal consumed per day per 100 lbs. average live weight of steers	.632 lb.	.677 lb.

Notes on Experiments.

1. The loose steers made larger gains and cheaper gains than the tied steers.
2. The loose steers consumed more meal in proportion to their live weight than the tied steers, and apparently made better use of what they consumed.
3. The loose steers always had good appetites, and were not so easily put off their feed as the tied steers.
4. The results this year are in harmony with last year's results, but the experiment is being repeated.

LIVE STOCK.

During the year, some additions have been made to our live stock equipment, with a view to increasing its usefulness for educational purposes. Last spring, a four-year-old imported Clydesdale mare was purchased. We now have three pure-bred Clydesdale mares, which is not a large number, but about all we can handle with our present accommodation. We also have on hand the yearling son of "Her Pretty Sel," 8976, and a colt foal out of "Princess Maude," [2282] 11192.

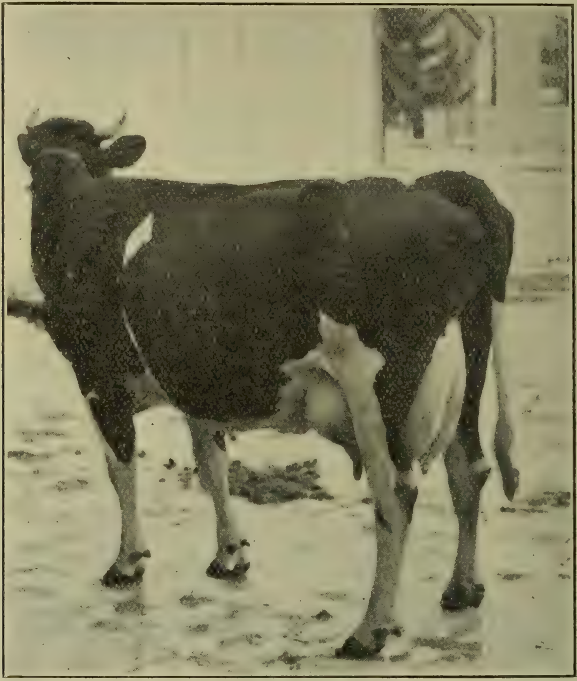
Summer visitors inspecting the beef breeds of cattle at the Ontario Agricultural College, Guelph.

At the special request of Prof. Dean, the Farm department took over the herd of dairy cattle on January 1st of this year. During the year there have been added to the dairy herd five Ayrshire cows, three of which were imported; one imported Ayrshire bull, and four Jersey cows. These additions have greatly strengthened the herd for class room purposes.

A REMARKABLE MILK RECORD.

In his annual report for 1906, Prof. Dean refers to the Holstein cow, Boutsje Q. Pietertje De Kol, 6093, C.H.F.H.B. This cow dropped her second calf on October 26th, 1906. As she is not due to calve again until next spring, she has had an exceptional opportunity to make a record, but her record is, nevertheless, remarkable. It is as follows:

Record for	1 day,	96	lbs. milk.				
"	7 days,	643	"				
"	30 "	2,522	"	88.27	lbs. fat=	103	lbs. butter.
"	365 "	20,778	"	781.91	"	912.22	"



Holstein Cow, Boutsje Q. Pietertje De Kol, 6093, C.H.F.H.B. Owned by Ontario Agricultural College.

During the week she made her highest record, she was fed a heavy meal ration, the heaviest meal ration for one day being one pound gluten feed, three pounds oil cake, three pounds cornmeal, and about nineteen pounds of a mixture of bran and mixed meal. In addition, she was fed mangels, corn silage, and mixed clover and timothy hay. As we did not wish to risk injuring the cow, the quantity of meal was reduced to about fourteen pounds per day, and her average meal ration from the time of calving until going out to pasture in the spring, was about fifteen pounds per day. While on pasture, she was fed about five pounds of meal per day, and since coming into the stable this fall, she has been fed ten pounds of meal per day.

THE DAIRY HERD.

The bulky ration for the general herd is the same as that previously mentioned as fed to "Boutsje." The quantity varies with individuals, but will average about forty pounds mangels, thirty pounds silage, and about fifteen pounds hay to each cow per day. Cows in full milk receive from eight pounds to ten pounds of meal each per day depending upon the productiveness of the cow. Cows well advanced in lactation, and dry cows receive proportionately less, the quantity being governed by the condition and apparent requirements of the cow. Generally, the bulk of our meal ration consists of ground oats and bran, but this winter, owing to the high price of oats, we are feeding a mixture of bran and "Molac," a preparation obtained from the "Quaker Oats" people of Peterborough.

Record of Dairy Herd from December 1st, 1906, to November 30th, 1907.

Name of Cow.	Breed.	Age Dec. 1, 1906.	No. of days milking.	Lbs. of milk.	Average per cent. of fat.	Lbs. of fat in milk.	Lbs. of butter, adding ⅙ to fat.	Value of fat at 25c. per lb.	Cost of feed.	Profit over cost of feed.
								$ c.	$ c.	$ c.
Boutsje................	Holstein.......	4	365	19,064	3.76	716.64	836.08	179.16	69.40	109.76
Adelaide	"	9	257	11,806	3.7	441.19	514.72	110.29	48.28	62.01
Margaret Cornelius.....	"	9	343	12,283	3.4	416.76	486.22	104.19	49.28	54.91
Molly De Kol...........	"	5	298	10,880	3.4	380.49	443.9	95.12	41.92	53.20
Abby Mercena..........	"	6	267	9,979	3.8	379.75	443.04	94.93	43.45	51.48
Lady Springwood II....	Holstein Grade.	3	344	10,519	3.4	357.82	417.46	89.95	45.04	44.91
Lady Rockwood, O.A.C.	Holstein.......	4	308	9,722	3 5	340.09	397 7	85.02	39.82	45.20
Marjorie Cornelius	"	3	338	9,372	3.4	317.39	370.38	79.34	42.81	36.53
Inka Mercedes	"	7	334	10,172	3.06	312.14	364 16	78.03	47.47	30.56
Glennie, O.A.C	Ayrshire	3	308	7,283	4.1	302.00	352.3	75.50	37.40	38.10
Lady Nancie 2nd........	"	6	365	6,940	4.1	285.15	332.67	71.28	37.65	33.63
Molly	Holstein Grade.	5	211	7,494	3.6	273.34	318.89	61.84	37.04	24.80
Toitilla	Holstein.......	5	225	7,442	3.4	253.64	295.91	63.41	39.81	23.60
Beauty, O.A.C	"	2	295	7,578	3.17	240.23	280.27	60.06	33.57	26.49
Mercena Netherland ...	"	2	308	7,574	3.06	231.82	270.45	57.95	40.51	17.44
Nero's Lass...........	Jersey.........	6	252	5,263	4.3	226.81	264.61	56.70	32.53	24.17
Average of 16 cows...	....	..	301	9,585	3.58	342.2	399.2	85.55	42.87	42.30

Notes on Herd Record.

1. Only cows which have completed, or nearly completed, a year's milking in the herd are included in the table. A number of cows have been purchased during the year, and have been milking only a few months while in our possession. These have been omitted from the table, as there would be nothing gained by reporting their performance for a few months. They will be included in next year's report.

2. It will be noted that Boutsje's record as shown in the table is not equal to her record as reported elsewhere. This discrepancy arises from the fact that our yearly record for the herd commences on December 1st and closes November 30th. Boutsje freshened October 26th, 1906, and during November, 1906, she made her highest monthly record. Since our yearly report opens December 1st, 1906, it will be seen that her highest month is omitted from the totals shown in the table, and her lowest month, viz., November, 1907, takes its place. The table really shows what Boutsje produced in twelve months, omitting what she produced during her first month of lactation, and putting what she produced during her thirteenth month of lactation in its place.

3. To ascertain exactly the amount of feed consumed by each cow in a large herd, is a difficult matter. By occasional weighings, however, a reasonably close approximation of the food consumed by each cow can be obtained. The figures given in the table regarding the cost of feed are not claimed to be exact, and may vary a few dollars one way or the other on any one cow. At the same time, we feel sure that they are close enough to the truth to be instructive, and hence they are included. The variation from the exact cost cannot be more than a few dollars in any case, and it is quite probable that in some cases the cost of feed stated in the table is higher than it should be.

4. In affixing values to foods consumed, we have aimed to fix upon values that may be retained year after year for purposes of comparison, rather than to follow constantly fluctuating market values. The following values have been employed: Meal of all kinds, $20.00 per ton. Hay, $8.00 per ton. Roots and silage, each $2.00 per ton. Pasture, $1.00 per cow per month.

5. For a year like the present, these values are too low, but for a normal year, they are quite reasonable. Our meal mixture always comprises a large proportion of bran, and it is rarely that the cost of our meal ration exceeds $20.00 per ton. At the present time (January, 1908), the meal mixture we are feeding our cows costs us $22.75 per ton. An increase of 20 per cent. in the cost of feed as shown in the table would quite meet the extra demands of the present winter, and even with such an increase in the valuation of the feed, these sixteen cows would still show an average profit of $34.10 per head above the cost of feed.

6. It must be borne in mind that the figures given in the table relative to cost of feed, deal mainly with the winter of 1906-07, when feed was a good deal cheaper than at present.

7. We have an advantage in getting our bran at wholesale rates, but if farmers would co-operate, they could also obtain the same advantage.

Respectfully submitted,

G. E. DAY.

PART XIII.

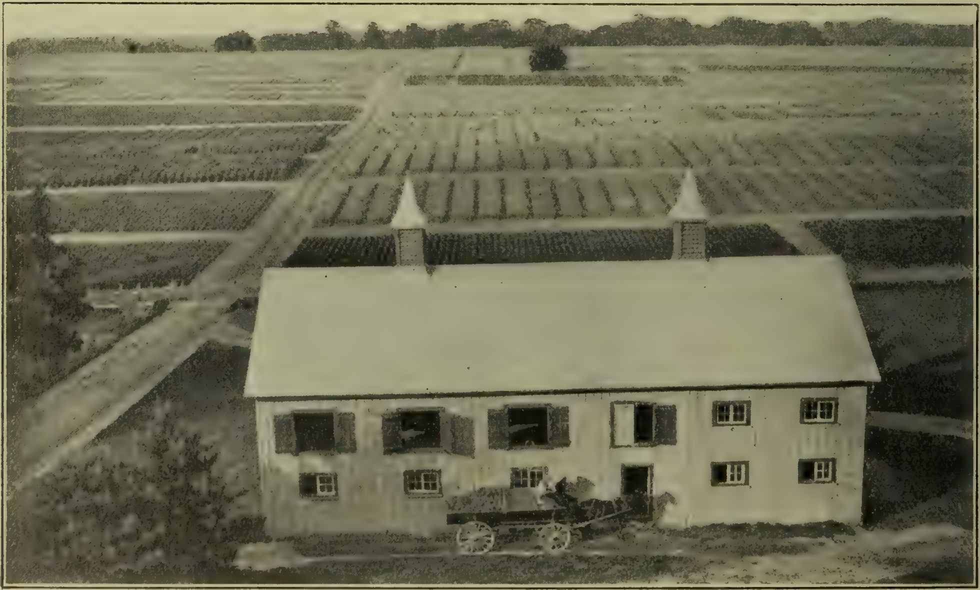
THE PROFESSOR OF FIELD HUSBANDRY AND DIRECTOR OF FIELD EXPERIMENTS.

To the President of the Ontario Agricultural College:

Sir,—I have the honor of submitting herewith the report of the work done in the department of Field Husbandry for the year 1907. The work of giving instruction to students, of carrying on field experiments at the College, and of conducting co-operative field experiments throughout Ontario has been performed during the past year with a considerable amount of satisfaction to myself, and I trust to all concerned.

I take this opportunity of publicly and sincerely thanking yourself, the Minister of Agriculture, and the Government of Ontario for so kindly giving me a leave of absence during the year 1906. Although my salary was continued as usual, I used practically all of it in travelling some twenty-two thousand miles in the study of agricultural problems in various countries. It was my privilege to attend and address the International Convention on Hybridization and Plant Breeding, held in London, England; the Annual Meeting of the British Association on Agricultural Education, held at Glasgow, Scotland; the Annual Meeting of the American Breeders' Association, held at Lincoln, Nebraska; the Annual Meeting of the Corn Growers' Association, held at Manhattan, Kansas; the Farmers' Congress, held at Denver, Colorado, etc. I also thoroughly appreciated visiting the Royal Agricultural Show of England, held at Derby; the Highland and Agricultural Show, held at Peebles, Scotland; and the Royal Horticultural Show of England, held at London. A two weeks' stay at the University at Cambridge. England, and a shorter visit at the Agricultural College, Glasgow, the University at Edinburgh, the Rothamsted Experiment Station at Harpenden, and at several Agricultural Colleges in England gave an opportunity to study the agricultural work which is being conducted at these institutions. I spent about ten days, when in London, at the British Department of Agriculture, and about twenty days, when in Washington, at the Department of Agriculture of the United States. The people at the Departments of Agriculture and those at the various institutions visited gave me a hearty welcome and were exceedingly kind throughout. Besides visiting the various people and institutions, I thoroughly enjoyed seeing some of the noted farms in the Old Country; such as, those owned by King Edward VII at Windsor, by Lord Roseberry at Dalmeny, by the Garton Bros. of Warrington, by Jno. Speir near Glasgow, and by Mr. Bone in Ayrshire. With scarcely less enjoyment were the visits made to some of the ordinary farms of England, Jersey, and Guernsey, which were mostly reached by means of walks through a few of the many interesting rural districts. In order to thoroughly enjoy rural England, it certainly must be seen at leisure. Some of the most pleasant and profitable features of the year were the forming of new and the renewing of old acquaintances with some of the foremost men in agricultural science of the present day. I was entertained in the home of Luther Burbank, Santa Rosa, California; Professor Bateson, Grantchester, England; Professor Middleton, Cambridge; Robt. Garton, Warrington; Professor Bruce, Edinburgh; Sir Trevor Lawrence, Burford;

Plant breeding grain plots in the front, experimental plots in the centre and part of the College buildings in the rear.



View of the barn and partial view of the plots of the Experimental department.

Professor Biffen, Cambridge, etc., and I met at the conventions Professor Tschermak of Vienna, Professor Johannsen of Copenhagen, Professor Wittmack of Berlin, Professor Noorduijn of Groningen, Professor Pfitzer of Heidelberg, Professor Percival of Reading, England, Professor Wallace of the University of Edinburgh, Professor Hendrick of the University of Aberdeen, Professor Wilson of St. Andrews University, and very many others, whose acquaintances I prize very highly. By knowing these gentlemen personally, I hope to keep in close touch with their work of investigation and particularly in the study of heredity and its practical application to plant breeding.

During the past year, Mr. C. R. Klinck, a graduate of our College, was appointed to take the position in the department of Field Husbandry made vacant by the resignation of Mr. H. G. Bell, who left us to accept an appointment on the staff of the Agricultural College of Iowa. We also increased our force by the appointment of Mr. A. W. Mason, a graduate of 1905, and of Mr. R. W. Mills, a graduate of 1907. Owing to illness, Mr. Mills was compelled to stop work for a time and has not yet returned. Mr. J. Buchanan, lecturer in Field Husbandry, had charge of the department during my absence in 1906, and I wish to bear testimony to the efficient manner in which he performed the duties of the department, and also to the able assistance which he has rendered during the year just closing. I have been ably and cheerfully assisted, also, by Mr. W. J. Squirrell, a graduate of the College, by Mr. A. E. Whiteside, the foreman, and by Miss J. I. Coxon, the stenographer, all of whom have not only been faithful in the performance of their duties, but have manifested a deep interest in the work of the Department.

The duties of the department of Field Husbandry are certainly numerous, as can be imagined from a glance at the following outline of the work of the past year.

(1) The delivering of lectures and the giving of demonstrations in the class room, the laboratory, and the field, before the freshmen, the sophomore, and the senior classes in the regular College course, as outlined in the College Calendar; also before students taking the short course in stock and seed judging, those taking the dairy course, and those taking the nature study courses at the College and the Institute.

(2) The conducting of experiments in field agriculture on about 2,000 accurately measured plots at the Agricultural College.

(3) The improving of the leading varieties of barley, oats, winter wheat, spring wheat and field peas by means of systematic selection and of cross fertilization, there being about 17,000 hybrid plants grown separately in the experimental grounds in 1907.

(4) The directing of co-operative experiments on upwards of 4,000 farms throughout Ontario, the reports of which will be found in the annual report of the Ontario Agricultural and Experimental Union.

(5) The delivering of addresses by the writer at various gatherings of farmers and others throughout Ontario as follows: One before the Agricultural Committee of the Ontario Legislature, Parliament Buildings, Toronto; one before the Teachers' Convention of North Simcoe at Guelph; one at the Farmers' Picnic near Dunville in Welland County; one at the Canadian Institute, Toronto; one at the Canadian Club, Orillia; one before the Board of Trade at Guelph; one before the Women's Institute of South Wellington at Marden; one at the annual meeting of the Farmers' Institute of North Grey at Owen Sound; two at a special meeting of the Farmers' Institute of North Waterloo at Elmira; one at a Stock Breeders' Banquet at Guelph; one at the Rittenhouse School near Beamsville in Lincoln County;

one at the Macdonald Consolidated Rural School at Guelph; one in School Section No. 6 Guelph Township, and one in School Section No. 2 Puslinch Township; one at a meeting of a committee in connection with the farm crops competition in Ontario, held at the Canadian National Exhibition, Toronto; three at the annual meeting of the Ontario Agricultural and Experimental Union, Guelph; one at the session on seeds at the Provincial Winter Fair, Guelph; about twenty-five before the thousands of farmers who visited the College and the experimental grounds in the month of June. An address was also delivered at the annual meeting of the American Association of Farmers' Institute Workers, Washington, D.C.

(6) The writing of agricultural reports and articles, including the report of the Experimental department of the College and of the co-operative experimental work in agriculture throughout Ontario, and also the articles which are sent to the farm journals and newspapers throughout the year.

(7) The carrying on of a very large correspondence with farmers, seedsmen, fertilizer manufacturers, experiment station officers and others throughout the entire year, and especially at some seasons when the letters received number about one thousand per week.

(8) The judging of grains, roots, potatoes, etc., at agricultural exhibitions. Within the past year the writer, or one of his staff, acted as judge at the Canadian National Exhibition, Toronto; the Fall Fair, Guelph; the Spring Seed Fair, Guelph; the Autumn Seed Fair, Guelph; the Fall Fair, Stratford; the Fall Fair, Simcoe; the Spring Seed Fair, Markham; and the Provincial Winter Fair, Guelph.

(9) The furnishing of plants, seeds, and instructions for demonstration plots at the exhibition grounds at Simcoe, Ontario.

(10) The fulfilling of duties required of the Secretary of the Ontario Agricultural and Experimental Union, the Vice-President of the Canadian Seed Growers' Association, Dr. Robertson's representative on the Board of Control of the Macdonald Consolidated Rural School, a member of the seed committee of the Ontario Provincial Winter Fair.

(11) The outlining of courses of instruction in Field Husbandry for the agricultural classes in the High Schools and in the short summer course for Public School teachers.

Experimental Work in Field Husbandry.

About fifty acres of land, divided into upwards of 2,000 plots, are used for experiments conducted with varieties of grain, root, tuber, grass, clover, fodder, silage, and other crops; with artificial, green and farmyard manures; with methods of cultivation, selection of seed, dates of seeding, etc. All of these experiments are conducted with the greatest care, and for several years in succession in order to secure strictly accurate results. These experiments deal with the crops grown on over nine-tenths of the cultivated land in Ontario.

The grounds have a gentle slope towards the southwest, and the soil is an average clay loam. About one-quarter of the land is manured each year with twenty tons of farmyard manure per acre; thus most of the land receives an application of farmyard manure once every four years. No commercial fertilizers are used except in distinct fertilizer experiments, and these occupy only a small number of plots each year. Within the past eleven years one green crop has been plowed under on each section of the field. The plots vary in size according to the requirements of the different experiments, and the yields per acre are determined from the actual yields of the plots in every instance.

Although these two new hybrids, produced from Emmer and Spelt, are quite different, they are both from the same parents.

New wheats produced at the College by means of cross-fertilization.

Farmers examining the plots of grass mixtures.

The work in the Experimental department consists in planning the various experiments; laying out, seeding, and looking after the field plots; harvesting, threshing, weighing and testing the grain; taking up, weighing, counting, testing and storing the potatoes and roots; cutting, weighing and harvesting the grass, corn and fodder crops, etc., and also in picking by hand the samples of grain grown on the plots, some to be sown on the plots the following year and some to be distributed for co-operative experimental work throughout Ontario. A great deal of thought and care is required in planning, supervising and examining these plots, and in studying, comparing and summarizing the results for presentation in reports, bulletins, newspaper articles, and lectures.

Results of Experiments.

All of our field experiments are conducted for at least five years before conclusions are drawn, and many of them continue for a much longer period of time. For the results of some of the tests which were carried on for five or more years previous to 1907, the reader is referred to former reports. The results of some of the experiments which have as yet been conducted for only one or two years, are withheld until the tests can be carried through for at least another summer. As different seasons vary so much in temperature, rainfall, etc., the average results of experiments continued for several years are of much greater value than those secured from only one or two years' work. Owing to the great care exercised in the work and the number of years through which the experiments are continued, we are able to present the results with much confidence in their reliability and in their practical value. From year to year the reports of the experimental work are being more widely read and more carefully studied by the farmers of the Province, and this is leading to a greater interest in crop production and a deeper knowledge of plant life on the farms of our country.

Weather Conditions in 1907.

In order to better understand the results of the experiments with field crops conducted at the College, it is important to have a knowledge of the weather conditions of the different seasons during which the experiments were conducted. In each of the past eight years, careful records of the rainfall have been kept in connection with the Physical department at the College. The following table gives the total amount of precipitation in each of the six months of the growing season in each of the past eight years, as recorded at the College.

Month.	Amount of Precipitation during the six growing months.								
	1900	1901	1902	1903	1904	1905	1906	**1907**	Average of 8 years.
April	1.69	2.24	2.43	2.69	2.10	1.82	1.44	**1.66**	**2.01**
May	1.03	3.26	1.67	2.44	3.01	3.89	2.71	**2.64**	**2.58**
June.........	4.47	1.53	3.06	3.05	2.86	3.24	4.06	**1.11**	**2.92**
July	3.05	4.07	6.43	2.67	4.99	4.60	4.65	**1.92**	**4.05**
August.......	.87	3.51	2.18	3.47	3.88	1.98	2.13	**.62**	**2.33**
September ...	1.52	2.45	3.58	1.48	2.80	2.85	2.49	**2.87**	**2.51**
Total	12.63	17.06	19.35	15.80	19.64	18.38	17.48	**10.82**	**16.40**

Experiments with potatoes in the front and with mixtures of grasses in the rear

Weighing grasses grown on the experimental plots.

Hauling in Barley which was grown in the plots in connection with the work in plant breeding.

The foregoing table presents some interesting figures in reference to the rainfall during the summer season of each of the past eight years. It will be observed that in 1907 the rainfall was exceptionally light, the total amount being only about two-thirds as much as the average total for the past eight summers. It will be observed also that the amount of rainfall in June, July, and August was exceptionally small, being less than one-half the usual amount in each of these months. According to the records for Ontario, as taken by the meteorological department in Toronto, we learn that the average amount of precipitation for the six months of the growing season for each of the twenty-four years previous to 1907 was 15.92 inches. It will, therefore, be seen that the total rainfall at the College for the six months of the growing season of the present year is only about two-thirds as great as the average rainfall for a similar period for each of the past twenty-four years, throughout Ontario.

Farm Crops in Ontario.

According to the latest census of Canada, the annual value of the products of Agriculture is seven times greater than that of the forests, eight times greater than that of the mines, and nineteen times greater than that of the fisheries. In fact the products of agriculture are greater in value than the combined total value of all these and also of the manufactured products less the cost of material.

According to the same statistical report, we learn that the agricultural wealth of Ontario is greater than that of all of the rest of the Dominion combined. There are yet vast areas of good farming lands in Northern Ontario, of which only a small proportion is just being brought into cultivation, the greater amount being still unoccupied and in fact almost unknown.

The people of Canada are proud of the great wealth of natural resources in the form of the mines, forests, and fisheries of the Dominion. Not many, however, realize that the annual value of the field crops grown in Ontario alone is greater than the combined value of the products of the forests, and the mines, and the fisheries of the whole of Canada. It is exceedinly gratifying to note that the average yield per acre of some of the principal farm crops is now increasing from year to year, owing to the introduction of better varieties and to the improved methods of agriculture which are being adopted. There are yet exceptionally fine opportunities and almost unlimited possibilities for the agriculture of Ontario. The young men of the Province have plenty of room for their best thoughts and their deepest study in their endeavours to become thoroughly good farmers, in the highest sense of the term. The fertility and the cultivation of the soil, the ripening and the storing of the crops, the selection and the preservation of the seed, the feeding and the care of the farm stock, the breeding of the plants and the animals, and many other problems of great value and of intense interest, require not only a practical training in the operations of the farm, but also a good knowledge of the underlying principles of agriculture and exceedingly good judgment in the application of those principles to the various operations on the farm. In agriculture, nature is a co-worker with man. It is therefore essential that man know something of the laws of nature before he can expect to develop an agriculture of the highest type. Even the most common plants and animals, and the most humble operations on the farm are worthy of the best thoughts of the best men. In order to know which are the most valuable classes of crops to grow to meet the various requirements, the most desirable varieties of each class to furnish the largest amount of food of the best quality, the most suitable time and method to sow each variety to use advantageously the fertility and the moisture in the soil, etc., are all questions which every farmer should determine for himself. In this work, however, the Experimental department at the College is in a position to give a large amount of valuable assistance. As the market value of the farm crops of Ontario now amounts to about $135,000,000 annually, we believe that it shows both good judgment and economy on the part of the Government to develop largely the experimental work in Field Husbandry at the College.

We can easily perceive that slight mistakes in the selection of the most suitable crops for growing in the various localities, while they may not prove disastrous, may easily result in considerable loss to the individual farmer. Sufficient thought has not been given to this phase of the question of crop production amongst our farmers. The selection of crops is necessarily governed to a large extent by the location of the farm, the quality of the soil, the particular kind of farming which is followed, etc. There are many things to be taken into consideration in the selection of those crops which are likely to give the best satisfaction. Every farmer knows that oats will, as a rule, yield more bushels per acre than will barley, and that barley in turn, is likely to yield more bushels per acre than wheat; but the bushel is a bulk measure and not a weight measure, and the weight of grain produced per acre is of much greater importance than the bulk. As there are more than four million acres of the cultivated land in Ontario devoted to the growing of oats, barley, spring wheat, spring rye, and peas, it is both interesting and valuable to make a study of the comparative yield of these crops, taking weight instead of bulk into consideration.

The following table which has been compiled from the reports of the Bureau of Industries, gives the average yields for twenty-five years in both bushels and pounds per acre of barley, oats, field peas, spring wheat and rye, grown on the farms throughout Ontario.

	Bushels.	Pounds.
Barley	27.6	1,325
Oats	36.2	1,231
Field Peas	19.4	1,164
Spring Wheat	15.9	954
Rye	16.4	918

From this statement it will be seen that barley surpasses oats in yield of grain per acre by nearly one hundred pounds per annum in the average of Ontario for a period of twenty-five years.

An experiment has been in progress at the College for the past six years in order to glean as much reliable data as possible regarding the relative productiveness of our principal spring grains. For this experiment seeding took place on April 24th, 1902; on May 5th, 1903; on May 4th, 1904; on April 24th, 1905 and in 1906; and on May 3rd, 1907. In each of these years, twelve varieties of farm crops were grown in duplicate, making in all twenty-four plots in the experiment each season. The following table gives the average results of the twelve tests made during the six years in date of ripening, length of plants, percentage of rust and yield of both straw and grain per acre, and also of the duplicate test made in 1907 in yield of straw and of grain.

Varieties.	Date of Ripening	Length of Plants.	Percent'ge of Rust.	Straw per acre.		Grain per acre.	
	Average 6 years, 1902-'07.	Average 6 years, 1902-'07.	Average 6 years, 1902-'07.	1907.	Average 6 years, 1902-'07.	1907.	Average 6 years, 1902-'07.
		inches.		tons.	tons.	lbs.	lbs.
Emmer (Common)....	Aug. 17...	39	4	2.0	2.2	2,968	**2,756**
Barley (Mandscheuri).	" 4...	40	5	1.7	1.9	2,595	**2,715**
Oats (Joanette)	" 14...	38	7	2.2	2.7	2,449	**2,559**
Hulless Barley (Black).	" 4...	31	8	1.9	2.0	2,433	**2,527**
Early Oats (Alaska)...	" 7...	41	10	1.7	2.1	2,149	**2,395**
Hulless Barley (White)	" 7...	33	6	1.6	1.9	1,813	**1,992**
Spring Wheat (Wild Goose)	" 24...	47	9	2.4	2.4	2,339	**1,905**
Spring Rye (Common)	" 14...	53	4	1.9	2.1	1,805	**1,780**
Field Peas (Early Brittain)...............	" 21...	44	....	1.3	1.7	2,212	**1,772**
Flax (Common)	" 15...	28	....	1.6	2.0	1,326	**1,100**
Grass Peas (Common).	Sept. 8...	50	....	2.0	2.2	444	**753**
Vetches (Common) ...	" 2...	34	....	.7	1.6	5	**595**

The results at the College, as well as those throughout Ontario, show that barley has given a greater yield of grain per acre than oats. In the figures presented in the table, it will be seen that the Mandscheuri barley surpassed the Joanette oats by an average of over one hundred and fifty pounds of grain per acre per annum. The difference between the Mandscheuri barley and the Alaska oat, which is a very early variety, is even greater. The Common Emmer, however, stands the highest in average yield of grain per acre of the twelve different kinds of grain under experiment. Emmer represents one of the types of spring wheat, the grain being used as feed for stock instead of for the production of flour. Common Emmer has about 21, Joanette oats about 23, and Mandscheuri barley about 15 per cent. of hull on the grain. In 1907, the spring wheat and the field peas gave exceptionally high, and the grass peas and vetches unusually low yields per acre.

The Choice of Varieties.

Not only is it important to select the most suitable classes of crops in order to meet the requirements of the farm and of the farm stock, but it is necessary to give close attention to the particular varieties of each of the different classes of crops. After carefully watching the crop production of the Province and closely observing the experimental work at the College for the last twenty-two years, the writer is thoroughly convinced of the importance of farmers securing the best varieties of crops possible for their own particular farms and requirements. Some varieties are particularly desirable, owing to the fact that they usually produce very heavy yields per acre; while others are desirable, owing to the fact that they are exceptionally early in maturing. Some varieties of grain produce very long straw and are particularly suitable for growing on land which is rather poor in quality, while other varieties naturally produce short straw and generally thrive well on rich, mellow loams. It is difficult to express in a few words the great importance of a proper selection of varieties for crop production, as there are so many things to be taken into consideration. In order to show somewhat clearly some of the differences in varieties in regard to yield per acre, we here present the average results from growing four varieties of barley, four varieties of oats and four varieties of potatoes, for eighteen years; and of four varieties of winter wheat for eleven years.

Classes.	Varieties.	Number of years.	Average yield per acre.
			bushels.
Barley	Mandscheuri	18	70.9
	Oderbrucker	18	64.3
	Mensury	18	60.0
	New Zealand Chevalier	18	59.4
Oats	Joanette	18	88.6
	Siberian	18	87.5
	Egyptian	18	76.4
	Black Tartarian	18	71.3
Winter Wheat	Dawson's Golden Chaff	11	54.6
	Imperial Amber	11	51.3
	Treadwell	11	45.3
	Turkey Red	11	45.3
Potatoes	Empire State	18	223.7
	Rural New Yorker, No. 2	18	202.9
	White Elephant	18	200.5
	Stray Beauty	18	163.9

Although the table here presented shows marked differences in the productiveness of different varieties of barley, oats, winter wheat and potatoes, when those varieties have been carefully tested over a long series of years, there are many decidedly more striking differences than these amongst the long list of varieties which have been grown for a shorter period of time. The figures here presented, however, show quite clearly that some varieties are apt to produce much more heavily than others when grown under similar conditions from year to year. It is important to know that although the different varieties of barley, oats and potatoes have been grown in the Experimental department at the College for eighteen years in succession, the average yield per acre for the last five years is considerably greater than the average yield per acre for the first five years of the eighteen year period in the case of each of the varieties under experiment. As there was no change of seed from one farm to another during this length of time, it shows that it is quite possible to grow these crops for a considerable length of time without the introduction of fresh seed from other localities, providing proper care is exercised each year in the quality of the seed used.

The Ontario Agricultural and Experimental Union.

The Ontario Agricultural and Experimental Union is doing an admirable work in this Province. It forms a close connection between the scientific worker at the College and the practical worker on the farm. Under the guidance of this organization, upwards of four thousand farmers throughout Ontario conducted co-operative experimental work in agriculture at their own homes in 1907. When the farmers themselves once become both interested and active in the carrying out of some important and well defined line of experimental work, they have entered upon a course of thought and action, the good results of which it is impossible to correctly estimate. This work not only enriches the lives and improves the farming operations of those who are actually engaged in the work, but it also tends to the betterment of agriculture generally. It helps to impart to those who engage in the work some of the important and essential features of a true education.

IMPROVEMENT OF FARM CROPS.

Our work in plant breeding has been receiving a considerable amount of attention during the past few years. This involves the systematic testing of varieties, the thorough selection of plants and seeds, and the proper mating and skilful crossing of varieties of different characteristics, in order to produce new sorts with the object of combining the good qualities and of eliminating the undesirable characteristics of the parent varieties. Work of this kind requires not only a practical knowledge of the greatest needs of the farmers, but also a scientific knowledge of the laws of nature and especially of heredity, as well as a considerable amount of time, money, good judgment, patience and perseverance. About 17,000 hybrid plants of farm crops were grown separately in the experimental grounds at the College this season. Some exceedingly interesting and very promising hybrids have already been obtained. It has been stated that the introduction of improved varieties of farm crops, through the medium of the Agricultural College and the Experimental Union, is worth to the Province of Ontario as much as it would require to maintain one hundred agricultural colleges. The prospects for future work in plant breeding and in plant introduction are very encouraging.

Making a cross-fertilization of different varieties of wheat

DIFFERENT DATES OF SEEDING.

Experiments have been conducted at the College in each of five years by sowing spring wheat, barley, oats and peas on each of six different dates in the spring; also by sowing Emmer and Spelt on each of eight different dates in the spring, and by sowing winter wheat on each of six different dates in the autumn of the year in order to obtain reliable and specific information regarding the best time to sow the different classes of farm crops.

Oats, Barley, Spring Wheat and Peas. In each of the five years in which this experiment was conducted with oats, barley, spring wheat and peas, the first seeding took place when the land was warm enough and dry enough to work to good advantage. One week was allowed between each two seedings unless unfavorable weather compelled a change of a day or two in the date of seeding. The grain was sown on each of six dates in each year, the average of the first date being April 18th and of the last date May 23rd. In yield of both grain and straw per acre, the highest results were obtained from the first date of seeding with the spring wheat and the barley, and from the second date of seeding with the oats and the peas. It was observed that as the date of seeding was delayed, the percentage of rust in the resulting crop was gradually increased, with only one slight exception. The results indicate the importance of sowing spring wheat, barley, oats and peas in the order here given, starting with the spring wheat and finishing with the peas. An exceedingly important lesson may be learned from the results of this experiment which show that for every day's delay in the seeding after the first week had passed in which the seeding took place, there was an average decrease of 56 pounds of oats, 53 pounds of barley, 29 pounds of spring wheat and 23 pounds of peas per acre.

Emmer and Spelt. In each of the past five years, both Emmer and Spelt have been sown on eight different dates in the spring of the year, by making the first sowing in each season as early as the land was suitable for cultivation. One week was allowed between each two dates of sowing. The average results of the experiments for five years are presented in the following table:

Dates of Seeding.	Average results for 5 years.					
	Lbs. per measured bushel.		Tons of straw per acre.		Lbs. of grain per acre.	
	Spelt.	Emmer.	Spelt.	Emmer.	Spelt.	Emmer.
First	28.3	40.1	1.6	1.9	2,377	2,747
Second	27.3	39.1	1.6	2.0	2,163	2,848
Third	26.3	39.1	1.7	2.0	1,898	2,646
Fourth	24.9	37.6	1.6	2.1	1,582	2,754
Fifth	24.2	36.7	1.5	2.1	1,287	2,569
Sixth	21.6	36.1	1.6	2.3	933	2,465
Seventh	19.6	35.4	1.5	2.4	685	2,312
Eighth	19.9	34.0	1.5	1.9	499	1,953

In an examination of the results as presented in the table, the reader will be impressed with the superiority of the Emmer as compared with the Spelt in weight of grain per measured bushel, and in yield of both straw and grain per acre. In no instance does the Spelt show a superior record to the Emmer. This superiority of Emmer over Spelt is also clearly shown in the results of the variety tests and need not be given further attention here. It will also be noticed that the second seeding and also the fourth seeding of the Emmer produced a higher yield of grain per acre than was obtained from the first seeding. In the case of Spelt, however, there was a very marked decrease in the yield of grain per acre as the date of seeding advanced. The results of all the experiments in sowing spring grains at different dates point to the conclusion that Emmer can be sown at a later date in the spring than any of the other cereals.

Winter Wheat. From experiments in sowing winter wheat on six different dates in the autumn of the year, the highest yields per acre have been obtained from sowing between the 26th of August and the 9th of September.

Quantity of Seed per Acre.

Many tests conducted at the College indicate the importance of sowing about ninety pounds of winter wheat per acre on an average soil. This amount might be increased for poor land and decreased for rich soil. If the land is in a good state of cultivation, it matters but little whether the seed is sown broadcast or with a tube drill, but if the land is dry or lumpy, that which is sown with the drill is likely to give the best results.

For three years in succession, each of four varieties of flax has been sown at the rate of one peck, two pecks, and three pecks, two bushels, three bushels, and four bushels per acre, making in all twenty-four plots in the experiment each year. On averaging the results of the four varieties sown with each of the quantities of seed per acre here indicated, we find that the yields of straw per acre and that the yields of flax seed per acre, after the seed used was subtracted from the crop produced, were as follows: One peck; 1.4 tons, 15.2 bushels: two pecks; 1.8 tons, 18.1 bushels: three pecks; 2.1 tons, 18.8 bushels: two bushels; 2.5 tons, 19.1 bushels: three bushels; 2.5 tons, 16.4 bushels: and four bushels; 2.5 tons, 13.5 bushels. It will be seen therefore that the greatest yield of flax seed, less the amount of seed used, was obtained by sowing two bushels of seed per acre. It is generally understood that when seed production is the only object in view, a much thinner seeding is desirable than when the crop is intended for the production of fibre. Therefore, when this experiment was commenced, it was expected that one of the first three seedings mentioned above would probably indicate the best quality of seed to sow per acre for the production of seed, and that one of the largest seedings would give a similar indication regarding the sowing of flax for fibre production. When flax is sown quite thickly, the stems grow slender and upright and do not branch, with the result that a much longer and better quality of fibre is produced than when thinner sowing is resorted to. There was a marked difference in the production from the different varieties, as will be seen under the discussion of the varieties of flax in a later part of this report.

Preparation of Land for Winter Wheat.

In an experiment conducted for several years in succession, winter wheat grown on land on which a crop of field peas was used as a green manure, produced an annual average of about 6½ bushels more wheat per acre than that grown on land where a crop of buckwheat had been plowed under.

In the Experimental department, winter wheat which has been grown on clover sod has yielded much better than that which has been grown on timothy sod.

THE BEST TIME TO CUT WINTER WHEAT.

For seven years in succession, five plots of each of the Dawson's Golden Chaff and the Early Genesee Giant varieties of winter wheat have been sown at the same time in the autumn and cut at five different dates in the following summer, a week being allowed between each two dates of cutting. Seed from each of the seventy cuttings was sown and the crop therefrom was harvested when ripe. As a result of all the experiments conducted, we find that seed which was allowed to become thoroughly ripened before it was cut, produced a greater yield of both grain and straw, and a heavier weight of grain per measured bushel than that produced from wheat which was cut at any one of four earlier stages of maturity.

TREATMENT OF GRAIN FOR SMUT.

In some seasons, great losses are sustained throughout the Province of Ontario through the development of smut in the crops of wheat and oats. As a large amount of this loss can be easily prevented by treating the seed before it is sown, we direct the reader's attention very particularly to the results of experiments conducted along this line. Each of two varieties of oats have received seven different treatments in each of five years, and each of two varieties of winter wheat have received five different treatments in each of four years. The various treatments used were as follows:

(1) *Immersion in Diluted Formalin.* The solution of formalin used for the immersion process was made by pouring one-half pint of the formalin into 21 gallons of water, and the seed oats were immersed in the solution for twenty minutes.

(2) *Sprinkling with Diluted Formalin.* One-half pint of formalin was poured into 5 gallons of water. The oats were then sprinkled with this solution and carefully stirred until the grain was thoroughly moistened.

(3) *Immersion in Hot Water.* For this treatment, the grain was placed in a bag, which was then immersed in water at about 115 degrees F. Soon afterwards it was placed in water which was kept at a temperature of between 130 degrees and 135 degrees F. The grain was occasionally stirred, and was allowed to remain in the water for a period of fifteen minutes. It was then spread out on a clean floor to dry, where it was stirred occasionally.

(4) *Immersion in Bluestone Solution for Twelve Hours.* In this treatment, the bluestone solution was made by dissolving one pound of bluestone in 25 gallons of water, and the oats were immersed in this solution for a period of twelve hours.

(5) *Immersion in Bluestone Solution for Five Minutes.* For this treatment, a strong solution was made by dissolving one pound of Copper Sulphate (bluestone) in one gallon of water, and then immersing the oats in the solution for a period of five minutes.

(6) *Immersion in Potassium Sulphide Solution.* The Potassium Sulphide treatment consisted in soaking the seed for two hours in a solution made by dissolving eight pounds of Potassium Sulphide in 50 gallons of water.

(7) *Sprinkling with Bluestone Solution.* This solution was made by dissolving one pound of bluestone in 10 gallons of water, which was used for sprinkling over the oats until they were thoroughly moistened after being carefully stirred.

(8) *Untreated.* One sample of oats of each variety was left untreated in order that the influence of the various treatments might be observed.

After the treatments had been completed a few hours, the grains were carefully sown on separate plots, each of which was exactly one rod square. When the winter wheat was about ready to cut, it was carefully examined and the smutted heads were picked out and shelled. The rest of the crop was then threshed and again examined for the smut balls. When the oats were coming into head, they were examined frequently and all smutted heads removed and carefully counted. The following table gives the average results in percentage of smutted grains of winter wheat, and of smutted heads of oats for the number of years during which the experiments were conducted.

Treatment.	Oats.	Winter wheat.
	Per cent. of smut in crop. Average of 5 years.	Per cent. of stinking smut in crop. Average of 4 years.
Immersion in diluted formalin	.0	.0
Sprinkling with diluted formalin	.0	.0
Immersion in hot water	.0	.0
Immersion in bluestone solution for 12 hours	.1	.0
Immersion in bluestone solution for five minutes	.8	....
Immersion in Potassium Sulphide solution	1.2	....
Sprinkling with bluestone solution	1.3	.1
Untreated	5.7	3.5

The untreated winter wheat in 1907 had a little less than one per cent. of smutted grain. This amount was exceptionally light. In 1905, over nine per cent. and in 1904, nearly four per cent. of the whole crop from the untreated seed was ruined with smut. Whether the amount of stinking smut is large or small, it can be very effectually prevented by the formalin treatment mentioned above. The foregoing table shows that several treatments have been quite successful in preventing the development of stinking smut in wheat and of the loose smut in oats, but some of them have proven to be slightly injurious to the seed to which they are applied. The results of all the experiments, however, show that the greatest yield of winter wheat and the greatest yield of oats per acre was produced from immersing seed in a solution, made by adding one pint of formalin to 42 gallons of water, in which the grain was immersed for a period of twenty minutes. This treatment was easily applied, comparatively cheap, effectual in killing the smut spores, and also effectual in producing the largest average yield of both wheat and oats per acre of all the treatments used.

Susceptibility of Different Varieties to Attacks of Smut.

At one time it was considered that variety exerted but slight influence in regard to the amount of injury caused by smut. It is certainly true that smut in grain cannot possibly occur unless there are smut spores present which are capable of re-production. It seems quite evident, however, that varieties of both winter wheat and oats do not offer equal conditions for the growth and the development of smut. Some varieties certainly appear to be decidedly more susceptible than others to the attacks of smut. During the years 1902, 1903, 1904, and 1905, we did not treat our varieties of oats for smut, but carefully picked out all smutted heads each year and kept an accurate record of the amount of smut produced in the different varieties. The results are very striking. The following gives the number of smutted heads taken from a plot 10 links wide by 100 links long, from different varieties of oats in each of the years 1902, 1903, 1904, 1905.

Variety.	1902	1903	1904	1905
Early Ripe	....	....	3	....
Joanette	20	9	10	18
Siberian	32	43	78	20
American Banner	116	303	317	22
Black Tartarian	332	608	369	62
Early Champion	634	380	1,244	166

The foregoing table shows a wonderful difference in the comparative amount of smut produced by the different varieties of oats. Another year we expect to add smut spores to a few varieties which are usually very free from smut, in order to ascertain whether in the midst of an immense quantity of smut spores the varieties will still prove as resistant as they have in the past. Each of these varieties was treated with formalin in the spring of 1906, and not a trace of smut was found in any of the plots in that season. In the spring of 1907, the seed was not treated before it was sown and the number of smut heads which appeared on each plot was as follows: Early Ripe, 0; Joanette, 2; Siberian, 1; American Banner, 3; Black Tartarian, 3, and Early Champion, 11. These facts seem to show that the smut is again increasing most rapidly in those varieties which previously showed a marked susceptibility to the attacks of smut.

It will be observed from the foregoing table that the amount of smut produced is regulated to a large extent by the season, as there was decidedly more smut in the oat crops of 1903 and in 1904 than in those of 1902 and 1905.

It is quite probable that the Early Ripe is entirely immune to the attacks of smut. It is true that there were three smut heads found in the plot in 1904, but when it is considered that about 17,000 grains of oats are sown in each plot, it is quite likely that the three smutted heads were all from one plant, produced from a seed of some other variety which, by means of manure or in some other way got into the plot. Taking advantage of the apparent immunity of the Early Ripe oats to the attacks of smut, we have now about one hundred and eighty crosses between this variety and the American Banner. The Early Ripe variety is the earliest oat amongst some two hundred and fifty varieties which we have grown in the experimental grounds, but the grain is long and slender, giving a very light weight per measured bushel. If we can secure a hybrid, possessing the good qualities of the American Banner with the earliness and the immunity to smut of the Early Ripe, it will prove of exceedingly great value to the agriculture of the Province.

SEED MIXTURES FOR GRAIN PRODUCTION.

A large amount of experimental work has been carried on at the College within the past eighteen years in the endeavor to glean reliable information regarding the different values of grain mixtures, in comparision with the growing of the same grains separately for the production of both grain and straw. Most of these experiments have now been conducted for several years in succession, and the results which have already been obtained have exerted a considerable amount of influence throughout Ontario, in a general sowing of certain grains in definite proportions.

For five years in succession, an experiment was conducted in growing oats, barley, spring wheat, and peas separately, and in eleven different combinations, having two, three or four grains in each mixture. The results show that the grain which was sown in mixtures produced larger yields per acre than the same kinds of grain sown separately, in from ninety to ninety-five per cent. of the tests. Of the eleven distinct mixtures used, the combination of oats and barley gave the highest average yield of threshed grain per acre. This mixture also gave a decidedly larger yield than any of the grains grown separately.

Barley and Oats Used in Combination.

In the spring of 1899 it was decided to conduct an experiment by sowing nine different proportions of oats and barley in order to determine which mixture and which quantity of seed would give the best results in the production of grain and straw. The lightest seeding used consisted of one-half bushel of oats and one-half bushel of barley, and the heaviest seeding of one and one-half bushels of oats and one and one-half bushels of barley per acre. The experiment was conducted for six years in succession. The average results showed that the greatest number of pounds of grain per acre was produced from a mixture of one bushel of oats (34 lbs.) and one bushel of barley (48 lbs.), or a total amount of 82 pounds of mixed seed per acre. For a fuller report of this experiment, the reader is referred to pages 31 and 32 of the Ontario Agricultural College Bulletin No. 140. In the spring of 1907, another experiment was started by testing nine different proportions of oats and barley. A mixture of four pecks of oats and four pecks of barley by weight per acre was the only mixture which was similar in the two experiments. The experiment was conducted twice in 1907: first, by using the Mandscheuri barley and the Daubeney oats; and second, by using the Chevalier barley and the Siberian oats. The average results of the duplicate experiment are as follows:

Mixtures. Quantities of seed per acre by weight.	Average yield per acre, 2 sets.	
	Tons of straw.	Lbs. of grain.
3 pecks Oats, 3 pecks Barley	1.23	1,678
3 " " 4 " "	1.31	1,764
3 " " 5 " "	1.33	1,911
4 " " 3 " "	1.25	1,790
4 " " 4 " "	1.33	1,979
4 " " 5 " "	1.22	1,851
5 " " 3 " "	1.26	1,742
5 " " 4 " "	1.09	1,664
5 " " 5 " "	1.05	1,650

One of the interesting features of the results of this experiment is the fact that the highest yield per acre was produced from four pecks (34 lbs.) of oats and four pecks (48 lbs.) of barley, the identical combination which gave the highest yield of grain in the former experiment of a somewhat similar character which was conducted in duplicate in each of six years. Another interesting feature of the experiment is the fact that both the lightest and the heaviest seedings gave comparatively low results in yield of grain per acre. This experiment will likely be repeated for several years.

In 1902 and in each of the four years following, an experiment was conducted in duplicate in order to ascertain whether a seed mixture, composed of one bushel of oats and one and one-half bushels of barley per acre, could be improved by the addition of a small quantity of some other kind of seed. In addition to the mixture of oats and barley here mentioned, one-half bushel of flax, emmer, spring wheat and hulless barley were added, making in all five different combinations. The average results of the ten tests made in the five years showed that the greatest yield of grain per acre was produced by the use of oats and barley without the addition of any other kind of grain as included in this experiment.

When barley and oats are grown in combination, it is, of course, necessary to use varieties which will mature at about the same time, in order that they may be harvested to best advantage. For this purpose, a very early variety of oats should be used with the common six-rowed varieties of barley, or a very late variety of barley should be used with an ordinary maturing variety of oats. For an early ripening crop we have found that Mandscheuri barley and Daubeney oats make an excellent combination, but where it is desirable to use such oats as the Siberian or the Banner, the later two-rowed barleys, such as, the Chevalier or the Canadian two-rowed should be used in the mixture. Our experience and the experience of other experimenters in different parts of the Province, goes to show that the mixture of Mandscheuri barley and Daubeney oats gives splendid satisfaction, ripening well together and producing a large yield of grain. In 1907, an extensive experiment was conducted at the College in order to ascertain whether any mixture could be found which would likely give better satisfaction than the Mandscheuri barley and the Daubeney oats, which had given such good returns in the past. As a result of all the combinations used, it was found that the highest yields of grain were produced by the Mandscheuri barley combined with either the Daubeney or the Alaska variety of oats. These two mixtures were followed most closely by a combination of the French Chevalier barley with the Siberian oats, the Mandscheuri barley with the Joanette oats, and the Mandscheuri barley with the Guy Mayle barley. A mixture made by using either the Banner or the Siberian oats with the Mandscheuri barley proved unsatisfactory, owing to the difference in the maturity of the varieties and to a lighter yield of grain obtained per acre.

TWELVE KINDS OF GRAIN GROWN IN COMBINATION.

In the spring of 1902, an experiment was started in growing twelve kinds of grain in different combinations. One of the principal objects of this experiment was to learn which of twelve different kinds of grain would produce the greatest percentage of both straw and grain in the crop produced. The mixtures were made up in two different ways: first, by using the same amount of seed of each variety as is usually sown when the grains are grown separately; and second, by using equal quantities of seed of all the varieties. Each of the mixtures here described was sown at the rate of 112 pounds of seed per acre. Both parts of the experiment were conducted in duplicate each year. The following table gives the average results of two tests in each of six years, and shows the percentage of each grain in the crop produced from each of the methods of combination indicated above :

Varieties used in each mixture.	Percentage of grains in mixtures.			
	Uniform weights of seed sown. 6 years. 12 tests.	Quantities of seed in same proportion as when grown separately. 6 years. 12 tests.	Average of two classes of mixtures.	
			1907 4 tests.	6 years. 24 tests.
Six-rowed Barley (Mandscheuri)	18.1	17.1	18.5	17.6
Spring Rye (Common)	13.3	14.1	15.7	13.7
Hulless Barley (Black)	12.5	14.2	9.9	13.3
Early White Oats (Alaska)	12.7	9.4	10.6	11.0
Black Oats (Joanette)	11.9	8.6	11.3	10.2
Emmer (Common)	7.0	7.9	11.2	7.5
Hulless Barley (White)	5.8	6.9	5.3	6.3
Peas (Field)	4.4	7.6	4.8	6.0
Spring Wheat (Wild Goose)	4.8	6.3	8.8	5.6
Grass Peas	5.6	4.7	2.9	5.2
Vetches (Common)	2.3	1.9	.0	2.1
Flax (Common	1.8	1.3	1.2	1.5

The comparative value of the different classes of crops for growing in mixtures is quite clearly shown in the tabulated results of six years' experiments here presented. It will be seen at once that there is a somewhat higher percentage of six-rowed barley in the product of both mixtures than of any of the other grains. The common spring rye made a strong fight for supremacy in the battle of the survival of the fittest in the experiment of 1907. Although the spring rye has made a very good showing in regard to production, it is not nearly as suitable a crop to sow with barley as a variety of oats which will mature at the right time. In the table here presented, the oats also stand comparatively high in the percentage of grain in the crop produced. These results therefore go to confirm the results of other experiments, and show that it is difficult to make a mixture which will produce a heavier yield of grain per acre than one made by a combination of barley and oats. It will also be seen from this table that emmer produced but a small percentage of the mixture in either test, showing that while it is a heavier yielding grain when sown alone, it is not so well suited for growing in combination with other crops.

In the spring of 1907, another mixture somewhat similar to the one just described, but which contained only eight varieties, was used for seed purposes. This mixture was also sown on four separate plots and the crop produced was carefully analysed. The following gives the percentage amount of grain from each crop included in the mixture: Mandscheuri six-rowed barley, 24.1; Red Fife spring wheat, 16.9; Common Emmer, 13.8;

Banner oats, 13.6; Wild Goose spring wheat, 10.6; Dakota Mammoth spring rye, 10.2; Early Britain field peas, 5.9; and Guy Mayle hulless barley, 5.1. The results of this experiment again show the supremacy of the Mandscheuri six-rowed barley when used in combination with other grains. Experiments with this mixture will likely be repeated for several years in succession.

VARIETIES OF THE SAME CROP GROWN IN COMBINATION.

For four years in succession we have grown different varieties of winter wheat in combination, with the object of ascertaining whether or not there was any advantage in growing mixtures as against growing the varieties separately. The results so far show that the mixtures have given very similar results to the averages of the varieties when grown separately. In an experiment conductd in 1907, in growing the different varieties of oats separately and in combination, it was found that there was practically no advantage from mixing the varieties for crop production. The results of our experimental work up to date, therefore, seem to strongly indicate that there may be a decided advantage from growing different classes of cereals in combination, but that there is no marked advantage from growing different varieties of the same class in combination.

VARIETIES OF OATS.

With the exception of the area devoted to the production of hay and pasture in Ontario, no other crop is grown so extensively as oats. The number of acres used for the oat crop in 1900 was 2,398,834. The area has gradually been increasing since that time, until at present upwards of 2,700,000 acres are used for the cultivation of the oat crop in this Province. This area is fully three times as great as that used for any other cereal which is grown in Ontario.

No less than two hundred and ninety-five varieties of oats have been tested in the Experimental department at the College within the past nineteen years. Most of these have been tested very carefully for at least five years in succession. Many of them have proven comparatively worthless for growing in Ontario, but a large number are good varieties and some are decidedly superior in yield and in quality to many of the kinds which were formerly grown extensively throughout the Province. The oat crop throughout Ontario during the past year was considerably below the average in yield of grain per acre. In many parts of the Province, the leaves of the oats turned yellow and the plants became unthrifty for a time, apparently owing to the very peculiar weather conditions of the past season. As the oat crop is such an important one, and as there have been so many inquiries regarding this crop during the summer of 1907, it is thought wise to present the results of this crop somewhat in detail. We had under experiment this year ninety-two named varieties of oats, besides a considerable number of selected strains and a large number of hybrids which were originated at the College. As fifty-nine varieties of oats have been grown under competition in the experimental plots at Guelph in each of the past five years, and as we believe the results will be studied with a great amount of interest, we present the averages of these varieties in this report. The average results for five years and the yield per acre for 1907 of each of fifty-nine varieties of oats are as follows :

Varieties.	Days to mature. Average 5 years.	Height. Average 5 years. Inches.	Per cent. rust. Average 5 years.	Weight per measured bushel. Average 5 years.	Yield per acre.		
					Tons of straw. Average 5 years.	Bushels of grain.	
						1907.	Average 5 years.
Yellow Russian	111	47	11	33.0	2.8	69.5	102.0
Vick's American Banner	112	49	14	34.8	2.9	65.9	101.9
New Zealand	112	48	12	33.7	2.6	68.4	99.4
Peerless	112	50	14	34.2	2.7	64.7	97.7
Irish Victor	112	51	16	34.8	2.4	66.4	97.4
Siberian	109	48	11	34.2	2.5	71.7	96.8
Michigan Wonder	112	50	15	34.6	2.5	67.1	96.7
German Rust Proof	112	50	13	34.3	2.7	68.0	96.4
New Golden Cluster	112	47	13	31.2	2.5	66.2	96.3
Ertragreichster	113	49	14	33.6	2.6	66.0	96.1
Liberty	112	50	14	33.5	2.7	63.9	96.0
Ligowa Hafer	109	48	13	35.9	2.7	64.9	95.9
Imported No. 534, Iowa	107	46	10	33.7	2.3	64.6	95.8
Imported No. 545, Iowa	108	46	8	34.2	2.3	61.2	95.5
Canadian Pride	108	48	10	33.4	2.4	69.7	95.2
Waterloo	112	49	13	34.9	2.5	67.1	94.4
Newmarket	109	49	12	35.8	2.6	72.6	94.3
The Great American	112	50	15	32.5	2.8	64.2	93.1
Joanette	110	42	6	35.1	3.1	68.6	92.9
Prince Royal	109	48	16	35.0	2.4	63.2	92.3
Rennie's White Irish	109	48	12	35.9	2.6	59.7	92.1
Twentieth Century	109	47	13	35.0	2.3	64.0	92.0
Swedish Wisconsin No. 4	108	49	13	35.1	2.4	66.1	92.0
Abundance	109	49	13	35.6	2.6	65.2	91.6
Improved Ligowa	109	48	12	35.9	2.5	63.8	91.4
New Sensation	110	46	11	35.9	2.6	62.3	91.2
Oderbrucker	111	47	13	35.0	2.4	62.1	91.1
Bavarian	111	50	11	34.5	2.9	60.0	91.0
Alaska	100	45	5	34.4	2.1	78.7	90.3
Waverly	113	50	15	35.2	2.7	63.3	90.1
Daubeney	101	43	6	34.4	2.1	80.8	90.1
Sheffield Standard	111	48	14	35.0	2.5	64.3	88.5
Napoleon	111	48	14	34.6	2.5	64.3	88.2
Original Leutewitzer Gelbhafer	112	49	13	34.1	2.6	56.1	88.0
Golden Fleece	112	49	14	33.9	2.6	63.9	87.4
Black Anthony	112	47	13	32.3	3.1	67.8	86.3
Probsteier	111	47	12	35.9	2.3	59.0	86.3
Potato	111	47	15	36.0	2.6	64.8	85.2
Egyptian	110	49	12	37.5	2.9	72.4	85.0
Tobolsh	108	48	13	37.2	2.5	61.9	84.9
Reliable	114	48	13	30.0	3.1	65.9	84.5
Black Beauty	105	43	13	34.9	2.6	59.4	83.9
Black Tartarian	113	48	13	32.2	2.6	59.9	83.9
Molian	109	50	13	34.3	2.7	56.9	83.0
Goldfinder	116	47	18	31.4	2.8	58.0	82.8
Early White Pearl	105	46	11	33.4	2.5	67.4	82.5
Black Diamond	107	44	10	30.3	2.6	56.6	81.5
Tartar King	108	48	14	35.1	2.5	56.6	81.5
Sunshine	117	48	17	30.1	3.0	60.8	81.5
Early Champion	102	45	8	34.6	2.1	63.5	81.3
Prosperity	100	43	7	34.4	2.4	58.0	80.7
Besler's Hafer	114	54	16	34.6	3.1	53.2	80.5
Early Ripe	98	42	6	28.5	2.2	65.0	79.5
Black Mesdag	99	48	10	31.2	2.5	78.4	79.4
Pioneer	107	42	16	35.0	2.7	55.7	79.0
Zhelannie	104	50	13	37.2	2.8	50.7	76.6
Early Dawson	104	50	13	39.3	2.9	44.4	70.6
White Superior Scotch	104	50	13	38.5	2.6	44.4	69.4
Hulless Oats	107	50	8	....	3.1	45.5	56.2

It will be observed that the varieties are given in the order of verage yield of grain per acre for five years. Each of two varieties produced an annual yield at the rate of a little more than 100 bushels of grain per acre. Twenty-nine varieties gave an average yield of between 90 and 100 bushels, 21 varieties between 80 and 90 bushels, five varieties between 70 and 80 bushels, one variety between 60 and 70 bushels, and one between 50 and 60 bushels per acre. The ten highest yielding varieties produced an average of 22.8 bushels per acre per annum more than the ten lowest yielding varieties in the average of the five years' experiments. The ten highest yielding varieties also matured about eight days earlier on the average than the ten varieties standing at the bottom of the list in yield of grain. There was a difference of nineteen days between the earliest and the latest maturing varieties, the Early Ripe maturing in 98 and the Sunshine in 117 days after the seed was sown. Some of the oats which gave the heaviest average weight per measured bushel produced comparatively small yields of grain per acre. There was an average difference of exactly one foot in the comparative height of the different varieties, the Joanette being the shortest with 42 inches, and the Besler's Hafer the longest with 54 inches in height of crop. In average yield of straw per acre, the Alaska variety produced only 2.1 tons, while the Joanette and several other varieties produced 3.1 tons per acre, being a difference of exactly one ton per acre. The Joanette, although a very short strawed variety, stools wonderfully well and thus produces a comparatively heavy yield of straw per acre. There was a variation in the yield of grain per acre in 1907 from 44.4 for the Early Dawson and the White Superior Scotch, to 80.8 for the Daubeney. It is interesting to note that the Daubeney, which has previously proven itself to be one of the very best early varieties of oats, gave a greater yield per acre than all competitors, enumerated in the foregoing table under the very unfavorable weather conditions of the past year. The Daubeney produces a white grain, which is of very good quality indeed being quite thin in the hull. It is expected that the Yellow Russian, which occupies the highest place in yield per acre in the average of the experiments for five years, and the Daubeney, which gave a comparatively high yield of grain per acre in 1907, will be two of the varieties used for distribution throughout Ontario in 1908, to be used in connection with the co-operative experimental work of the Experimental Union.

The Strength of the Straw of Oats.

For several years there have been numerous inquiries regarding oats which would not become lodged, even on rich land and in wet seasons. Although we have not found any varieties of oats, amongst nearly three hundred, which would stand up under all conditions of environment, we have, however, found that there is a marked difference in the strength of the straw of different varieties. After studying a large number of varieties for several years, we selected ten different sorts in the spring of the present year and sowed them all in duplicate in low, rich ground in the experimental field. Amongst the ten kinds selected were some of the weakest and some of the strongest strawed varieties, as well as some of the highest yielding oats of former years. While the oats on the high land stood up comparatively well in 1907, those placed on the low land gave an excellent opportunity for studying the comparative strength of straw of the different varieties. The following table gives the average results of the two sets of oats included in a special experiment to determine the comparative strength of straw of the different varieties in 1907.

Varieties.	Percentage of rust.	Percentage Lodged.	
		3 weeks before ripening.	When ripe.
Golden Beauty	21	5	60
Siberian	23	5	20
Sheffield Standard	26	5	59
Liberty	35	0	7
Iowa Silver Mine	20	7	31
Banner	30	1	8
Tartar King	21	0	64
Daubeney	21	1	8
Kherson	19	1	11
Early Champion	30	2	19

As the varieties are presented in the report in exactly the same order in which they were grown in the field, the results are very interesting, as they show very decided differences in the strength of straw of the varieties included in the experiment. Those varieties possessing the stiffest straw in 1907 were the Liberty, Daubeney, Banner, Kherson, Early Champion, and Siberian. In comparison with these we notice also that the Tartar King, the Golden Beauty, and the Sheffield Standard varieties became very badly lodged. It may be a surprise to many to know that the Tartar King became lodged more than any other variety in this experiment. This oat is considered to be very stiff in the straw. We have found in the past, that frequently the Tartar King will stand longer than many other varieties before lodging, but under a severe test, the straw becomes very brittle and occasionally lodges worse than the great majority of other varieties. When the Tartar King oats lodge, the straw is apt to break at right angles and the crop lies very flat on the ground and is not so apt to fill so well as some other varieties, the straw of which leans badly but does not break in such a way as to shut off the flow of sap through the straw.

VARIETIES OF SIX-ROWED BARLEY.

Barley is one of the most important cereal crops now grown in Ontario. The area devoted to barley has nearly doubled during the past ten years. Although the two-rowed barleys are grown very extensively in England, Germany and other European countries, the six-rowed varieties are used almost entirely in Ontario. Within the last twenty years, a large number of sorts have been carefully tested in our experimental grounds. These have nearly all been grown for at least five years in succession, after which the inferior kinds have been discarded and the best sorts have been continued in the experiments from one year to another. Each year new varieties have been added to the list. Four different kinds of six-rowed barley have now been grown under experiment for eighteen years in succession, the results of which will be found in an earlier portion of this report. From the figures there given, it will be seen that the Mandscheuri variety is decidedly superior to the others in yield of grain per acre. This variety was imported by the Ontario Agricultural College in the spring of 1889, and after being carefuly tested at the College it was distributed to the farmers of Ontario through the medium of the Ontario Agricultural and Experimental Union. It is now grown more extensively than any other variety in Ontario. The introduction of this variety has been worth a very great deal to Ontario from a financial standpoint. In the average results for the past five years, Mandscheuri has given an annual yield of 12.5 bushels per acre more than the Mensury variety. Not only is there a marked difference in these two varieties in productiveness, but there is also a decided difference in the growth of the two varieties which can be distinctly noticed soon after the barleys have headed out. The color of the beard is so different in the two barleys that it is not very difficult to distinguish one from the other. Although both kinds are of Russian origin, they should not be considered as the same variety any more than the Golden Vine and the New Canadian Beauty varieties of peas should be considered, in certain parts of the United States, as identical with the same varieties of Canada field peas. From a recent test made at the Central Experimental Farm at Ottawa, Dr. C. E. Saunders recognizes the fact that the Mandscheuri and the Mensury varieties of barley have differences which are quite observable in appearance. The Mandscheuri was decidedly superior in appearan to the Mensury on the Central Experimental Farm in 1907, and Dr. Saunders informed the writer that he intended to drop the Mensury entirely after the present year. The California Brewing barley, which has been grown at the College for a number of years, produces a high yield of grain per acre, but the grain is very coarse, the beards exceedingly stiff, and the straw is short and weak. The Oderbrucker variety of six-rowed barley, which the College imported from Germany, is one of the closest rivals which we have of the Mandscheuri. Although this variety has given an average during the past five years of about seven bushels per acre more than the Mensury, it has also given an average yield of about six bushels per acre less than the Mandscheuri. The Zulu King, which is a barley with a black hull and regarding which a great deal has been said during the last two or three years, gave a yield of 19.3 bushels per acre in 1907, and 14.3 bushels per acre in 1906 less than the Mandscheuri.

The highest yield of six-rowed barley, produced in 1907, was from what is known as No. 21, which is a special strain originated from a selection from the Mandscheuri barley which we made here at the College in 1903, in which year we grew upwards of 9,000 plants from seeds of the Mandscheuri barley which had been planted by hand and at equal distances apart.

We have been successful in producing a considerable number of hybrid barleys, using the Mandscheuri as one of the parents. These hybrids are exceedingly interesting and some of them are quite promising. We hope to get from some of the hybrids new varieties which will be of considerable value for general cultivation in Ontario.

VARIETIES OF TWO-ROWED BARLEY.

Sixteen varieties of two-rowed barley were grown in the experimental grounds in 1907. Of this number, eleven varieties have been grown for five years and six varieties for fourteen years in succession. The average results for fourteen years are as follows:

Variety.	Lbs. per measured bushel.	Tons of straw per acre.	Bushels of grain per acre.
Two-rowed Canadian	53.0	2.2	64.6
Jarman's Selected Beardless	54.0	1.9	63.8
New Zealand Chevalier	51.9	2.4	62.2
French Chevalier	52.3	2.4	60.9
Duckbill	52.9	2.2	60.9
Selected Canadian Thorpe	52.9	2.1	60.8

There are two very distinct classes of two-rowed barley. Those varieties belonging to the first class have strong straw and rather short, upright heads, while those belonging to the second class produce a somewhat weak straw and long, slender, nodding heads. Varieties of both of these classes produce plumper and more uniform grain than that produced by the six-rowed barleys. The Two-rowed Canadian and the Duckbill belong to the former, and the Chevalier to the latter class.

In the experiment with different varieties of two-rowed barley in 1907, the highest yields were produced as follows: Imported No. 5591, Hanna No. 5590, Jarman's Selected Beardless, and New Zealand Chevalier.

Varieties of Hulless Barley.

Nine varieties of hulless barley were grown in the Experimental department in 1907. The greatest yields were produced by the Purple, Hog and Guy Mayle varieties. Six varieties of hulless barley have been grown in the Experimental department for fourteen years in succession. The average results in weight of grain per measured bushel and average bushels per acre for the fourteen years are as follows: Guy Mayle; 61.3, 48.3: Purple; 63.5, 45.4: Black Hulless; 62.6, 44.9: Hungarian; 59.2, 42.0: Winnipeg No. 2; 55.7, 38.7: and Large Skinned; 59.2, 38.5. Of these varieties, the Black Hulless has been grown the most extensively throughout Ontario.

Varieties of Winter Barley.

Winter barley, grown at the College for eleven years, has given an average yield of 56.5 bushels of grain and 1.3 tons of straw per acre, and has produced grain which weighs 47.3 lbs. per measured bushel. In 1907, three varieties of winter barley were under experiment, the greatest yield being produced by the Tennessee variety, which was grown this year for the first time, and which gave an average of 53.4 bushels per acre. Within the past fourteen years the winter barley has been completely killed out on three occasions.

Varieties of Wheat.

According to several authorities, there are seven distinct species of wheat, and to one or another of these species all cultivated varieties belong. The species may be enumerated as follows:

(1) Common, fine, or soft wheat (*Triticum vulgare*).
(2) Turgid, or toulard wheat (*T. turgidum*).
(3) Hard, or flinty wheat (*T. durum*).
(4) Polish wheat (*T. polonicum*).
(5) Spelt (*T. spelta*).
(6) Emmer, or starch wheat (*T. dicoccum*).
(7) One-grained wheat (*T. monococcum*).

Nearly all the winter wheats and the majority of the spring varieties belong to the first class and are used chiefly for the production of flour.

Winter Wheat for Flour Production. Wheat and other autumn crops were sown rather more extensively throughout Ontario in the fall of 1906 than in the year previous. The crops, generally, got a good start before the approach of winter, but owing to the alternate freezing and thawing in the spring they were somewhat injured in certain parts of the Province. We learned, however, from the reports of our co-operative experiments that fairly large yields of wheat of good quality were obtained in many localities. At the College, autumn sown crops gave very satisfactory returns during the past year. Both the winter wheat and the winter rye produced good average yields of grain, which was considerable above the average in quality. The results from the winter barley and the Hairy Vetches, however, were somewhat lower than those in 1906.

Fully two hundred and fifty varieties of winter wheat have been grown at the Agricultural College within the past eighteen years. All varieties are carefully tested for a period of five years, after which the inferior kinds are dropped and the most promising sorts are continued in future tests.

In 1907, sixty-four varieties were under experiment. Of this number, fifteen varieties have been grown for less than five years, and forty-nine varieties for five years or over. As fifteen of the varieties have been grown for at least twelve years, the average results of these are very interesting and valuable. The following table gives the average weight per measured bushel for eleven years, and the average yield of grain per acre for each of two periods of six years, and also for the whole period of twelve years.

Variety.	Color of grain.	Lbs. per measured bushel. 11 years. *1894–1907	Bushels of grain per acre.		
			6 years, *1894–1900	6 years, 1902–1907	12 years, *1894–1907
Dawson's Golden Chaff	White	60.0	56.7	56.0	56.4
Imperial Amber	Red	60.7	52.1	53.4	52.8
Early Genesee Giant	White	59.9	51.9	52.1	52.0
Russian Amber	Red	60.9	50.7	52.1	51.4
Early Red Clawson	Red	59.0	50.9	51.0	51.0
Egyptian Amber	Red	61.3	49.8	52.0	50.9
Rudy	Red	60.9	47.1	48.6	47.9
Tasmania Red	Red	61.7	47.4	48.0	47.7
Tuscan Island	Red	61.0	46.7	47.0	46.9
Geneva	Red	62.3	45.3	48.5	46.9
Bulgarian	White	60.7	46.1	47.3	46.7
Treadwell	White	60.6	42.3	50.3	46.3
Turkey Red	Red	61.2	41.3	51.3	46.3
Kentucky Giant	Red	61.2	42.4	49.4	45.9
McPherson	Red	61.9	43.9	46.8	45.4

In 1907, the fifteen varieties here reported gave an average of 47.7 bushels of grain per acre, and of 62.3 pounds of grain per measured bushel.

The Dawson's Golden Chaff, which stands at the head of the list in yield of grain per acre in the average results for twelve years of each of fifteen varieties, also occupies the highest place in yield in each of the six year periods. It produces a very stiff straw of medium length, beardless heads, with brown chaff and white grain, somewhat soft, but about the standard in weight per measured bushel. As the heads are beardless and the chaff is of reddish shade, the standing crop has a beautiful appearance and is conveniently harvested. The Imperial Amber produces a large amount of straw, which is rather weak, a bearded head with a red chaff, and grain about average in weight and in hardness. The Early Genesee Giant is sometimes classed as an amber wheat, but in our reports we always place it as a white grained variety. It possesses a short, compact, bearded head, and

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*Owing to the very unfavorable weather conditions for Winter Wheat, in 1899 and 1901, the results for those two years are not included in the foregoing summary, and owing to the rainy harvest of 1902 the weights per measured bushel for that year are also excluded.

straw which is medium in length and also in strength. The grain of the Early Red Clawson variety weighs very light per measured bushel, and is comparatively soft and of poor quality. The grain of the Tasmania Red, Geneva, Kentucky Giant, Tuscan Island, and Turkey Red varieties is very hard, but the straw of each of these varieties is somewhat weak and the yield in every case is less than that of either the Dawson's Golden Chaff or the Imperial Amber.

Forty-nine varieties of winter wheat grown in 1907 have been under experiment for at least five years. In the five years' test the highest average yields of grain per acre have been produced by the Dawson's Golden Chaff (52 bushels), and other varieties which resemble it very closely, and which are as follows:—Abundance, 56.9 bus.; American Banner, 56.8 bus.; Beardless Rural New Yorker No. 6, 56.2 bus.; American Wonder, 55 bus.; Superlative, 54.5 bus.; Forty-fold, 54.1 bus.; Prize Taker, 52.4 bus.; Extra Early Windsor, 51.8 bus.; Mogul, 51.4 bus.; and Clawson Longberry, 50.3 bus. High average yields have also been produced by varieties of other types, such as: Paramount, 52.7 bus.; Imperial Amber, 50.1 bus., and Early Genessee Giant, 49.5 bus.

The heaviest weights of grain per measured bushel in the five years' test have been produced by the Economy, 61.9 lbs.; Geneva, 61.7 lbs.; Tasmania Red, 61.7 lbs.; Banatka, 61.6 lbs.; Kentucky Giant, 61.6 lbs.; and Crimean Red, 61.4 lbs.

Of the sixty-four varieties of winter wheat grown in 1907, the greatest yields of grain per acre were produced by the American Wonder, 77.1 bus.; Abundance, 63.9 bus.; American Banner, 63.8 bus.; Beardless Rural New Yorker No. 6, 63.8 bus.; Superlative, 62.8 bus.; Forty-fold, 62.8 bus.; and Prize Taker, 62.7 bus.: and the heaviest weights per measured bushel by the Northwester, 64 lbs.; Auburn, 63.9 lbs.; Ironclad, 63.8 lbs.; Tasmania Red, 63.6 lbs.; Banatka, 63.3 lbs.; Crimean Red, 63.3 lbs.; Bearded Pootung, 63.3 lbs.; Kentucky Giant, 63.2 lbs.; Yaroslaf, 63.1 lbs.; and Imperial Amber, 63 lbs.

According to the recent tests made in the bakery branch of the Chemical department of the College, the following were among the best varieties in furnishing good flour for bread production: Tasmania Red, Rudy, Onigara, Crimean Red, Yaroslaf, Turkey Red, Early Genesse Giant, Banatka, Northwester, Geneva, Imperial Amber, Tuscan Island, Kentucky Giant and Michigan Amber. These are all red wheats with the exception of the Early Genesee Giant, which is also classed as a red wheat in some sections. Unfortunately, most of these wheats are comparatively weak in the straw and are rather light yielders. Those varieties belonging to the Dawson's Golden Chaff type, although stiff in the straw and heavy yielders, produce grain with a lower percentage of gluten than many of the red kinds.

Generally speaking, white wheats yield more grain per acre, possess stronger straw, weigh a little less per measured bushel, are slightly softer in the grain, produce a more popular pastry flour and furnish a somewhat weaker flour for bread production than the red varieties.

Spring Wheat for Flour Production. The number of acres used for the growing of spring wheat for flour production throughout Ontario is decreasing from year to year, the area devoted to this crop at the present time being only about one-half as great as that of eight or ten years ago. There were in all, thirty-eight varieties of spring wheat grown in the Experimental department in 1907. Of these, the greater number were varieties grown for flour production. Amongst the heaviest yielders were the following: Carleton, 42.8 bus.; Preston, 36.5 bus.; Hungarian, 36.2 bus.; Herison Bearded, 35.9 bus.; and Minnesota No. 163, 35 bus. per acre. The Herison Bearded has given a yield of 30.2 bushels in the average of nineteen years; the Red Fern, 31.2 and the Red Fife, 30.4 bushels in the average of eighteen years; the Wellman Fife, 30.6 bushels in the average of sixteen years; and the Preston, 29.5 bushels per acre in the average of twelve years. A variety of spring wheat, under the name of Hungarian, obtained through the kindness of one of the students from the Argentine Republic, has given an average yield of 34.1 bushels per acre in the average of five years. This variety from the Argentine Republic is one of promise. The grain of the Herison Bearded variety weighed 65.7 lbs. in 1907, which is one of the heaviest weights of spring wheat ever produced at Guelph, although this same variety produced wheat which weighed 64 lbs. per measured bushel in 1905 and 65 lbs. per measured bushel in 1903.

Spring Wheat for the Production of Macaroni. The varieties of wheat used for the manufacture of macaroni belong principally to the third species mentioned in the foregoing list. Of this class of wheats, nine varieties were grown in 1907 and six varieties have been grown for fifteen years in succession. The following gives the average yield per acre for fifteen years of each of the six varieties: Wild Goose, 39.2 bus.; Medeah, 34.9 bus.; Bart Tremenia, 34.3 bus.; Sorentina, 33.2 bus.; Algiers, 32.3 bus.; and Ontario. 23.6 bus. per acre. The Wild Goose variety, which stands at the head of the list in yield per acre, is now grown over Ontario quite extensively, there probably being more acres devoted to this variety than to all other varieties of spring wheat combined. The Wild Goose spring wheat has been distributed throughout Ontario for a considerable number of years through the medium of the Experimental Union, and it has given large yields and has proven to be a heavy yielder throughout the Province. In the results for 1907, the Roumania, forwarded to us through the kindness of Dr. C. E. Saunders of the Central Experimental Farm at Ottawa, gave very good results indeed, the yield being 36.8 bushels per acre. The Iumillo variety, which has been exceedingly resistant to blight in the semi-arid regions of the United States, gave a yield of 33 bushels per acre in 1907, and of 29 bushels per acre in 1906, both of which are below those of the Wild Goose variety.

Spring Wheat for Feeding Purposes. From the classification of wheat at the beginning of this section of the report it will be seen that Emmer and Spelt are two distinct types. Each of these types or species of grain contains a number of varieties. They are used for grinding into meal for feeding to farm stock, owing to the fact that the chaff adheres to the grain and is not removed in the process of threshing.

In 1907, six varieties of Emmer and four varieties of Spelt were grown in the Experimental department. The variety of emmer which gave the greatest yield of grain was the Common, 3,152 lbs. and of spelt the Alstroum, 2,582 lbs. per acre. The lowest yielding variety of emmer gave about the same yield per acre as the highest yielding variety of spelt in the experiment of the past year.

The decided superiority of Emmer as a grain producer is very clearly shown by the figures in the table. For the six years through which this test has been carried, Common Emmer has given an average of 784 lbs. of grain per acre per annum more than the highest yielding variety of spelt. Not only is the superior yielding power of the emmer here shown but the better quality of the grain is also evident since there is a much lower percentage of hull on the emmer than on the spelt. The study of the table will reveal some very interesting facts regarding the value of these two classes of grain and also the merits of the different varieties of each.

Classes of crop.	Varieties.	Percentage of			Pounds per bushel. average 5 years.	Yield per acre.	
		Rust.	Crop lodged.	Hull with grain.		Tons of straw. average 6 years.	Pounds of grain average. 6 years.
Emmer..........	Common............	3	25	21	39.5	2.3	3246
	Iowa................	2	23	21	40.5	2.1	3042
	Russian.............	2	25	22	40.7	2.1	3000
Spelt............	Red	12	3	30	28.5	1.9	2462
	Alstroum...........	17	4	30	28.5	1.9	2457
	White...............	13	3	31	29.0	1.8	2199
	Dasyanthum.........	15	13	30	28.5	1.8	1938

Polish Wheat. This grain has been sold under various local names, such as; Corn Wheat, Colorado Giant Rye, etc., but it is known more generally the world over as Polish wheat (*Triticum polonicum*). It has been under test in our plots for some fourteeen years. In 1907 it produced a low yield of grain per acre, furnishing only 18.7 bus. per acre as compared with upwards of 30 bus. per acre for several of the other varieties of spring wheat. In no year, out of the fourteen, has it produced as high a yield as the Wild Goose variety.

VARIETIES OF RYE.

Although not extensively grown in Ontario the cultivation of Rye is still a fairly prominent feature of the agriculture in certain sections of the province. The area devoted to the growing of rye is about equal to that used for the production of mangels. It is interesting to note, however, that while the number of acres used for the growing of mangels is increasing that for rye is decreasing as time advances.

Spring Rye. The results for the experiments conducted at the college in 1907 show that four varieties of spring rye gave the following yields of grain per acre: Saatroggen, 36.5 bus.; Common, 31.8 bus.; Dakota Mammoth, 31.2 bus.; Prolific Spring, 31.1 bus. per acre. As these varieties have been grown for the past five years it is interesting to note the average yield of each variety for the five year period, which is as follows: Dakota Mammoth, 33.2 bus.; Common, 31.2 bus.; Prolific Spring, 30.7 bus.; and Saatroggen, 26.9 bus. per acre. It seems strange at first sight to notice the fact that the variety that gave the lowest average results for five years is the same variety that gave the highest yield per acre for 1907. This seeming inconsistency is clearly understood when we realize that the Saatroggen variety was obtained in Germany by the writer in 1901 and gave exceedingly low results during the first two or three years that it was grown in Ontario. This variety, however, produced the greatest yield per acre in 1905 as well as in 1907 and occupied second place in yield of grain in 1906. In the average results for the past three years it has given the largest yield per acre of any variety grown at the College. The Saatroggen is therefore the most promising variety of spring rye which we now have in Ontario.

Winter Rye. Four varieties of winter rye have been grown in the Experimental department in each of the past four years and have given the following average yields of grain per acre: Mammoth White, 67 bushels;

Washington, 62 bushels; Thousand Fold, 59 bushels; and Common, 58 bushels. In 1907, the yield per acre was in the same order as for the average of the four years, and in each case was upwards of 60 bushels per acre. In 1907, each of the varieties produced grain which weighed upwards of 59 lbs. per measured bushel, which is exceptionally heavy, as the standard weight per bushel for rye is 56 lbs.

VARIETIES OF CORN FOR GRAIN PRODUCTION.

Although about one hundred and thirty varieties of corn were grown in the Experimental department in 1907 a number of these were too late in reaching maturity to enable us to make determinations regarding the yields of shelled grain. About forty varieties, however, reached a sufficient stage of maturity to enable us to dry the ears, shell the grain, and thus ascertain the yields of shelled corn. The highest yields of grain produced in 1907 were as follows:—Farmer's Surprise, 67.9 bus.; Early California Flint, 67 bus.; Red Blazed, 65.2 bus.; Wisconsin Little Dent, 64.3 bus.; Wessel, 56.3 bus.; Hammond's White Cap Yellow Dent, 54.5 bus. per acre.

Nine varieties of corn have been grown and ripened in the Experimental department for seven years in succession. We present the following table which gives the average of seven years' results.

Varieties.	Average number of rows per ear.	Color of grain.	Yield of grain per acre (bus.)	
			1907.	Average 7 years.
King Phillip	8	Reddish.	50.9	61.2
Genesee Valley	8	Yellow.	45.5	58.0
Longfellow	8	Yellow.	33.9	54.2
Farmer's Friend	8	Yellow.	42.0	52.4
Red Blazed	8	Variegated.	39.3	51.5
Canada Yellow	8	Yellow.	43.8	50.9
Compton's Early	12	Yellow.	38.4	49.8
Burlington Hybrid	8	White.	51.8	47.4
Salzer's North Dakota	8	White.	32.1	46.4

The corns included in the foregoing table are all flint varieties. It will be noticed that with the exception of Compton's Early all possess ears having only eight rows. Those varieties of corn having small cobs and a small number of rows on each ear ripen earlier and cure more thoroughly than those having larger cobs and a greater number of rows per ear. The King Phillip has given a large yield of grain per acre in 1907 and also in the average results for seven years. Of the varieties included in this report the Farmer's Friend had the smallest percentage of cob per ear.

WHITE CAP YELLOW DENT CORN FOR GRAIN PRODUCTION.

The White Cap Yellow Dent variety of corn has been grown quite extensively by a number of farmers in the south-western part of Ontario and has been used partly for grain production and partly for the silo. As a number of the best farmers have been growing this variety for a considerable number of years and have carefully selected the best ears from year to year, and as the corn has become somewhat changed in its growth through its continuous selection and through its different environments, an experiment has been conducted with seed obtained from the different growers. The following table gives the average results of two tests conducted in 1906 and 1907 in average height and total yield per acre, and also of the duplicate test conducted in 1907 in grain production.

County.	Grower.	Height. Average 2 years.	Tons of total crop. Average 2 years.	Bushels of grain per acre, 1907.
		inches.		
Essex	C. F. Knight	115	15.4	**44.2**
Middlesex	E. M. Zavitz	118	15.2	**44.2**
Essex	J. Hammond	119	12.8	**42.4**
Essex	J. Thomas	118	13.3	**38.0**
Essex	W. Bryham	116	13.0	**36.3**
Essex	C. Weigle	114	15.8	**28.6**

It will be seen that the greatest yields were produced from seed obtained from Essex and from Middlesex Counties. It will be noticed that there is a variation of grain per acre from 28.6 to 44.2 bus. Seed was also sown from Mr. H. Smith of Elgin County and Mr. A. Dawson of Essex County, but the grain was not sufficiently ripened to give satisfactory results for grain production in 1907. Of the different lots here reported those from Hammond, Zavitz, and Bryham were the earliest and those from Weigle and Knight were the latest in reaching maturity. The seed obtained from Mr. Hammond has proven itself to be from one of the very earliest strains of White Cap Yellow Dent corn which we have grown at the College. This variety, however, is rather small in the ear and lighter in the total yield than any of the other strains which we have had under experiment.

Varieties of Buckwheat.

Six varieties of buckwheat were grown under similar conditions in 1907. The yield of grain per acre of each of the varieties was as follows:—Rye buckwheat, 31 bus.; Common Grey, 28.5 bus.; New Calcutta, 27.4 bus.; Silver Hull, 26.8 bus.; and Japanese, 24.6 bus. per acre. The Japanese gave unusually low results in the tests of the past year. Three of these varieties have now been grown under similar conditions in each of the past ten years, the average results for that period of time in yield of grain per acre being as follows: Silver Hull, 21 bus.; Japanese, 20.4 bus.; and Common Grey, 18.3 bus. The Silver Hull is a fairly constant yielder, but the Japanese variety is somewhat irregular in grain production, producing high yields in some seasons and comparatively low ones in other years.

Varieties of Flax.

In the spring of 1905, flax seed was obtained from Ontario, Manitoba, Holland, Russia and from the Argentine Republic. Six different quantities of seed per acre were used with each of the four first mentioned lots of flax, and this experiment was repeated in 1906 and again in 1907. In averaging the results of the six plots of each lot of flax for the three years, we obtained the following comparative yields of seed per acre: Manitoba Flax, 21.3 bus.; Common Flax, 20. 4, bus.; Russia Flax, 17.7 bus.; and flax from Holland, 15.1 bus. In 1907, the Manitoba gave the highest yield with 21 bushels, and the Holland the lowest yield with 14.9 bushels per acre.

From the small lots of seed, obtained through the kindness of students from the Argentine Republic, we were able to compare the results by growing the seeds on very small plots the first year and on larger plots in 1906 and 1907. Of the four different lots of seed obtained from the Argentine Republic, there was a great variation in the yield per acre, one lot giving as high an average as 19.3 bus. and another lot as low an average as 9.9 bus. per acre. Of all the different lots of seed obtained, the Manitoba flax has given us the highest yield of both seed and straw per acre.

MILLET FOR GRAIN.

There were in all seventeen varieties of millet under test in the department during the past season and most of these gave very fair yields of grain, seven of the varieties producing upwards of 40 bushels of seed per acre. The greatest yield per acre in 1907 was produced from a specially selected strain of Siberian Millet, which gave a yield of 51.5 bushels of seed per acre. Following that, we have the yields in 1907 of some of the highest producing varieties as follows: Steel Trust, 48.3; Hungarian and Holy Terror Gold Mine, each, 42.6; German or Golden, 41.7; Hog, 41; Siberian, 40.8; and Magic, 40.6 bushels. The Japanese Panicle, which frequently produces a large yield of seed, gave comparatively low results in 1907. Sixteen varieties have now been grown for five years in succession, and those giving the greatest average yields of seed per acre were as follows: Siberian, 54.7 bus.; Steel Trust, 51.9 bus.; Hungarian, 47 bus.; and Early Harvest, 41.4 bus. In weight per measured bushel the White French gave an average of 59.8; Hog Millet, 58.9; and the Red French, 58.1 pounds in the average of the five years. The Hungarian Grass produced seed which weighed 53.9 and the Siberian seed which weighed 53.5 pounds per measured bushel.

VARIETIES OF SORGHUM FOR SEED.

Of the various kinds of sorghum, including broom corn, sugar cane, kaffir corn, etc., which have been grown at the College for seed production for several years in succession, the best yields of seed have been obtained from the broom corns. In the average of five years' results we have obtained yields per acre as follows: California Golden, 31.1 bus.; Early Japanese, 30.9 bus.; Dwarf, 30.1 bus.; and improved Evergreen, 30 bus. per acre. In 1907, owing to the comparatively cool and late spring, many of the sorghums did not ripen, but the Dwarf broom corn gave slightly over 31 bushels of seed per acre.

VARIETIES OF SUNFLOWERS FOR SEED.

No less than seven varieties of sunflowers have been tested in the Experimental department, and of this number three have been grown for nine years in succession. Taking the standard weight for sunflower seed as being twenty pounds per measured bushel, we have obtained a yield of seed per acre in the average of nine years of 72.6 bushels from the White Beauty, 71.3 bushels from the Mammoth Russian, and 68 bushels from the Black Giant. These are certainly large yields per acre, but probably not much larger than might be expected from growing sunflowers under fairly good Ontario conditions. The seed is frequently used as feed for poultry.

VARIETIES OF FIELD PEAS.

Owing to the ravages of the pea weevil in south-western Ontario for a period of several years, many farmers discontinued the cultivation of the crop for a time. As the weevil has largely disappeared, however, the cultivation of this crop is again increasing to a considerable extent. No experiments were conducted at the College with different varieties of peas during the years 1904, 1905, and 1906. In the spring of the present year, however, twelve varieties were sown in our experimental grounds and the results were very satisfactory. The highest yielding varieties in bushels per acre were as follows: Multipliers, 51; Early Britain, 50.7; Canada Field, 48.5; Potter, 48.1; Black Eyed Marrowfat, 47.7; Golden Vine, 46.7; New Canadian Beauty, 45.2; Clamart, 43.5; White Eyed Marrowfat, 37.3; Canner, 33.9; White Scimitar, 33.3; Prussian Blue, 25.4. Eight of the varieties grown in 1907 were also grown in the experimental grounds in each of seven years previous. The average yields in bushels per acre for the eight years were as follows: Early Britain, 38.2; Potter, 35.2; New Canadian Beauty, 32.3; White Eyed Marrowfat, 32; Prussian Blue, 31; Black Eyed Marrowfat, 29.7; Golden Vine, 29.5; and Multipliers, 29.2. It will therefore be seen that the Multipliers, which gave a very high yield per acre in 1907, is not usually a particularly high yielder. The Early Britain, however, which occupied second place in yield per acre in the test for 1907, has also given decidedly the greatest yield per acre of all the varieties tested at the College for eight years. The Early Britain variety of peas was imported from England about twenty years ago. It is a brown pea and is slightly indented on the sides of the grain. The weight per measured bushel is therefore not as high as that of some other varieties, and the pea is not as salable on the market, but for farmers who wish to grow peas for feeding purposes the Early Britain will probably prove to be one of the very best which they can secure for the purpose. The yield of grain is high, the straw is a little more than medium length, and both the grain and the straw is of good quality.

VARIETIES OF FIELD BEANS.

Fourteen varieties of field beans were under experiment at the College in 1907. Owing to the peculiar weather conditions, however, the crops were late in maturing and the yields were unusually low, the highest being those of the Pearce's Improved Tree, the Marrowfat, the Burlingame Medium, the New Prize Winner, and the Red Kidney varieties. The results from the beans in 1906 were also very peculiar, some varieties producing exceedingly high results, the Pearce's Improved Tree giving 37.5 bushels, and the Marrowfat only slightly over 12 bushels per acre. As these eleven varieties were all grown in each of the nine years previous to 1906 ,the average results for those years are of great importance. The highest yields were produced by Pearce's Improved Tree, White Wonder, Medium or Navy, Burlingame Medium, Schofield Pea, Day's Improved Leafless and Buckbee's Electric Tree varieties. The New Prize Winner, which has not been grown for so many years, has given very good satisfaction throughout, except in 1906 when its yield per acre was rather low.

VARIETIES OF SOY, SOJA OR JAPANESE BEANS.

Although a large number of varieties of this class of beans have been tested for some years on our trial grounds, most of them have proven to be quite unsuited for growing in Ontario, as they require a long season in which to mature. A few varieties, however, ripen quite early and produce grain which is very high in feeding value, being even richer in this respect than our common field peas. Among the varieties which mature their seed at the College, the Early Yellow is worthy of special mention. This variety has been grown at the College in each of twelve years and yields per acre have varied from 6.9 bushels in 1893 to 30.4 bushels in 1906. The average for the twelve years is 15.3 bushels of seed per acre. The Medium Green variety of soy beans is a strong vigorous grower and usually produces a good yield of seed when it has time to mature before the nipping frosts occur in the autumn. It is, however, rather later than the Early Yellow variety and is rather unsafe to sow for grain production in Ontario, except on warm soils in the southern part of the Province. Soy beans are usually sown in rows from twenty-five to thirty inches apart, and about one-half bushel of seed is used per acre.

COW PEAS.

Although ten varieties of cow peas were grown in the Experimental department in 1907, not one variety matured seed. It is only in exceptional years that seed can be obtained from this crop in Ontario. Although the cow peas thrive admirably in the Southern States, the season required for their maturity is too long to enable the crop to mature in Ontario, except on the light warm soils and in favorable seasons.

GRASS PEAS.

Although Grass peas were grown quite extensively in the vicinity of Hamilton and in some other portions of the Province previously, the results from this crop have not been very satisfactory during the past few years, owing possibly to the seasons being somewhat cooler and the rainfall a little heavier than the average. The yield of grain produced from Grass peas at the College was only about 16.4 bushels per acre in 1907. We have obtained an average of about thirty bushels of grain per acre from the Grass peas over a series of years. The yield for 1906 and that for 1905 was, however, even less than that of 1907.

VETCHES FOR SEED PRODUCTION.

Hairy vetches have been used considerably as a cover crop in fruit districts and also as a fodder crop in a few localities in Ontario. They have also given good results for pasture purposes when sown in the spring and pastured in the same season, in the experimental work of the College. The seed, however, is very expensive, being mostly imported from Germany. In each of the past six years the Hairy vetches have been sown in the autumn and allowed to ripen in the following year. The results have varied greatly, the yields running from 1.5 to 18.2 bushels, the average for six years being 5.7 bushels per acre. In each of four years we have made a comparison between the use of imported seed and of Canadian grown seed for sowing in the autumn of the year. In every single instance, we have obtained decidedly better results from the Canadian grown seed. In the average results of the tests for the past four years we find that the yield of seed from the crop produced from Canadian grown seed was more than double that produced from imported seed. In 1907, the yield from Canadian grown seed was about three times as great as that from the imported stock. We feel in hopes that by continuously growing and selecting the Hairy vetches in Ontario, we may be enabled to produce a strain which is hardy and prolific in Ontario. Although we nearly always obtain larger yields of seed from Hairy vetches sown in the autumn than from those sown in the spring, in the past year we obtained decidedly better results in seed production from the spring seeding of Hairy vetches.

POTATOES.

Although the acreage devoted to potato growing in Ontario has been decreasing somewhat during late years owing to a variety of causes, such as, the scarcity of labor, the trouble from the rot, etc., yet this is an exceedingly important crop in connection with Ontario's agriculture. We believe that the area devoted to potato growing will increase during the coming year, owing to the fact that the rot almost entirely disappeared in 1907, and also to the fact that for a short time past the prices of potatoes have been considerably higher than usual. I wish to draw the attention of the reader to a valuable report on "Potato Growing in Ontario," prepared by Mr. H. B. Smith, a graduate of the College, who spent a considerable amount of time during the past summer in studying the potato question in the southwestern part of the Province. This report, which can be found in the annual report of Farmers' Institutes of Ontario for 1906, starting on page 35, contains a large amount of valuable information on this important crop.

Varieties. One hundred and eleven varieties of potatoes were grown in the Experimental department in 1907. Although the yields were not particularly high, the crop was entirely free from rot. Sixty varieties of potatoes have been grown in the Experimental department for at least five years in succession. Some very interesting information was given in reference to these varieties in our report for 1905, when the tabulated results of seventy-one varieties were given. From a study of experiments with different varieties of potatoes, grown both at the College and throughout Ontario, we find the following to be amongst the best when yield, size, freedom from rot, and table quality are all taken into consideration: late varieties; Empire State, Dempsey's Seedling, Rural New Yorker No. 2, and American Wonder: medium varieties; Rose of the North, and Burpee's Extra Early: and early varieties: Early Fortune, Early Harvest, Extra Early Eureka, Early Andes, and Early Dawn.

Planting Potato Sets of Different Sizes and at Different Distances Apart. For five years in succession, an experiment has been conducted by cutting potatoes into pieces of one ounce, one and one-half ounces, and two ounces in weight, and planting each twelve, eighteen, and twenty-four inches apart in the rows. As the results are very interesting and suggestive, we are incorporating in this report the averages for the past five years in the form of a table, which is as follows:

Weight of pieces.	Distance between pieces in the rows.	Per cent. of crop marketable. Average 5 years.	Total yield per acre. Average 5 years. Bus.
1 oz.	12	87	144.9
	18	88	132.5
	24	89	114.1
1½ oz.	12	84	166.9
	18	87	144.7
	24	88	117.8
2 oz.	12	84	179.3
	18	83	151.2
	24	88	134.1

It will be seen that the greatest yield per acre was obtained from the largest pieces which were planted the closest together. As the pieces increased in size, there was a gradual increase in yield per acre, and as the distance between the pieces in the rows decreased, there was also an increase in the yield of the crops produced.

Continuous Selection of Seed. For the past twelve years, continuous selections of seed potatoes have been made and the results recorded. The selections were large, medium sized, small, and very small potatoes which were planted without being cut. Decidedly the largest yield per acre was produced from the large whole potatoes, and as the seed potatoes decreased in size, there was also a decrease in the yields per acre of the potatoes. Not only did the small potatoes produce the lowest yield per acre, but the percentage of marketable potatoes in the crops produced was also the smallest.

Number of Potato Sets per Hill. In 1907, and in each of the seven years previous, an experiment was conducted by planting one piece, two pieces, and four pieces in each hill. The hills were the same distance apart in both cases, and the amount of seed used per acre was uniform throughout. The average results for the eight years show the annual yields per acre to be as follows: one piece per hill, 187.7 bus.; two pieces per hill, 183.1 bus.; and four pieces per hill, 165.4 bus. Not only is the total yield per acre in favor of having only one piece in a hill, but we find that in marketable potatoes there was 81 per cent. where only one piece in a hill was used, 77 per cent. when two pieces were used, and only 72 per cent. when four pieces were used in each hill. The more pieces per hill, the greater tendency there is to have a large number of stems which are weak, small and slender, and which seem to produce a large number of small potatoes.

Methods of Cultivation. Potatoes have been grown in rows about twenty-seven inches apart with the potato sets planted twelve inches apart in the row, in comparison with planting the potatoes in squares thirty-three inches apart each way. The same amount of seed was used in both cases. In 1907, the average yield per acre from the first method was 188 bushels, and from the latter, 149 bushels. In the average of nine years, the results of experiments are very similar to these, the average yield per acre from the rows being 193.8 bushels, and from the squares 154 bushels.

Treatment for the Potato Beetle. For twelve years in succession, an experiment has been conducted in duplicate by using different methods for destroying the potato beetle. The experiment consisted in spraying the potatoes with Paris green and water, Paris green and plaster, and Potato Bug Finish. As a rule, three applications were made on each crop. For the sake of comparison, one plot was allowed to remain untreated. The following gives the average annual yield of potatoes per acre from each of the treatments for the twelve year period: Paris green and water, 160.9 bus.; Paris green and plaster, 150.3 bus.; Potato Bug Finish, 129.7 bus.; and the potatoes which were left untreated, 87.1 bus.

In each of the past five years, six lots of each of two varieties of potatoes were carefully selected and planted on separate plots. After the potatoes had made sufficient growth and the potato beetles (bugs) had made their appearance, five plots of each variety were treated in different ways to destroy the beetle and one plot of each variety was left untreated, as a basis of comparison. The five treatments made in each of the years were as follows: (1) Paris green and water, by using one pound of Paris green and 96 gallons of water per acre; (2) Paris green and plaster, by using one pound of Paris green and 38 pounds of plaster per acre and applying the mixture to the potatoes in the dry condition; (3) Potato Bug Finish, which was applied dry at the rate of 20 pounds per acre; (4) Bug Death and water, by using on an average 32 pounds of Bug Death and 96 gallons of water per acre; and (5) Bug Death used in the same proportion as No. 4, but in the dry condition. Three applications of each of the five treatments were made with each of the two varieties of potatoes. In the autumn, the potatoes from each of the twelve plots were dug and weighed. The following are the average results of the experiment conducted for five years in succession, showing the yields in bushels per acre from each treatment.

Treatment.	Average yield per acre. 5 years. Bus.
Nothing	104.3
Potato Bug Finish	145.3
Paris Green and Plaster	183.3
Paris Green and water	199.6
Bug Death (Dry)	203.5
Bug Death and water	211.4

In eight out of the ten tests made during the five years, those potatoes which were sprayed with Paris green and water surpassed those which were dusted with Paris green and plaster in yield of crop per acre. It will also be observed that the Bug Death and water gave better results than where the Bug Death was used in the dry condition. The Bug Death in solution gave considerably larger yields of potatoes per acre than the Paris green and water. From the potatoes which were left untreated and on which the potato beetles were allowed to work unmolested, there was less than half the yield of potatoes, as compared with the crop produced from the treatment with Bug Death and water. The usual prices of these insecticides when bought in quantity are about as follows: Paris green, 20c.; Bug Death, 7c.; and Potato Bug Finish, 1¾c. per pound. The cost therefore for the material used in the experiments conducted in the last five years was about as follows: Paris green and water, 60c.; Paris green and plaster, 88½c.; Bug Death, $6.72; and Potato Bug Finish, $1.00 per acre.

Bordeaux Mixture for the Potato Blight. A large number of interesting experiments were conducted in 1907 in treating the potatoes to prevent the blight. For the first time, however, in the last five years there was no rot, even amongst the potatoes which were not treated. For the results of past experiments the reader is referred to the annual reports of former years.

VARIETIES OF MANGELS.

The Mangel crop is increasing in popularity from year to year in Ontario. It is probably owing to the increase in the dairy industry and to the introduction of better varieties of mangels that the acreage devoted to this crop has been largely increased in late years. Mangels usually produce a large yield of roots per acre. The roots generally keep well, are relished by the farm stock and do not taint the milk when fed to milch cows. Twenty-four different varieties of mangels were tested during the past season. Of this number, 20 varieties have been grown for five years in succession.

The following table gives the yields of roots per acre for 1907 and also the yields of both the tops and roots for the average of five years.

Varieties.	Tons of tops per acre.	Tons of roots per acre.	
	Average of 5 years 1903-07.	1907.	Average of 5 years 1903-07.
Yellow Leviathan	6.1	39.7	35.2
Evans' Improved Mammoth Sawlog	6.7	34.2	34.4
Sutton's Mammoth Long Red	6.2	35.0	34.2
Griewener Mangel	3.2	36.9	33.5
Long White	6.0	37.7	33.2
Ideal	2.8	36.3	32.9
Steele-Briggs' Giant Yellow Intermediate	5.1	30.6	32.6
Simmers' Improved Mammoth Long Red	6.3	34.6	32.5
Carter's Windsor Prizetaker Yellow Globe	2.5	36.8	32.3
Mammoth Golden Giant	4.9	30.7	32.1
Garton's Improved Yellow Globe	2.4	44.6	32.0
Rennie's Perfection Mammoth Long Red	5.9	33.0	32.0
Carter's Mammoth Prize Long Red	6.1	31.1	32.0
Steele's Long Red Selected	6.4	37.1	31.7
Yellow Leutewitzer	6.3	40.0	31.5
Norbitan Giant	6.2	34.7	29.8
Cornish Giant Yellow Globe	2.3	29.4	29.7
Mammoth Red Intermediate	3.6	35.5	29.2
Steele-Briggs' Giant Yellow Globe	2.5	31.0	28.9
Red Globe	4.3	36.5	28.2

The report shows a variation from 2.3 to 6.7 tons in average yield of tops per acre. The tops contain a large percentage of mineral matter and if removed from the land are quite exhaustive. If the valuable plant food constituents, which they contain, however, are retained evenly over the soil the fertility of the soil is not exhausted to nearly as great an extent as if the tops were removed from the land entirely or were left in heaps over the field. In average yield of roots per acre there is a variation from 28.2 to 35.2 tons per acre, or a difference of exactly 7 tons. The Yellow Leviathan is an intermediate variety which has made exceedingly satisfactory records both in the experiments at the College and in the Co-operative experiments throughout Ontario. It has given a higher average yield of roots per acre than any of the different strains of the Long Red Mangel which have been grown at the College. It will be seen by a study of the results given in the table that there is a marked variation in the productiveness of the different strains of the Intermediate Mangel, the Yellow Leviathan producing six tons per acre more than the Mammouth Red Intermediate. The Yellow Leviathian has produced the highest yield per acre of all the mangels used in the co-operative experiments over Ontario for the past four years. Not only is it the highest yielder but it also produces roots of compact form, is easily harvested and is of good keeping and good feeding quality.

Canadian Grown Mangel Seed. Practically all of the mangel seed which is used in Ontario is grown in Europe. Owing to the severe winters in Ontario, and the cost of labor, it is very difficult to produce root seed to compete with that imported from other countries where the climate is milder and the labor is much cheaper. From certain experiments and observations we have had the impression that Canadian grown root seed, especially when care was taken in the selection of the mother roots, would likely give better results than the imported seed. In the autumn of 1905 some very nice roots were selected and stored during the winter and in the spring of 1906 were re-planted. From some of these, seed was obtained in the autumn and was sown in the spring of the present year in the experimental grounds. Good seed was obtained from seven plants. The yield obtained from the seed of the individual plants varied considerably, the lowest being 29 tons and the highest being 53.6 tons per acre. The seed from 4 of the plants gave decidedly higher yields per acre than any of the 26 varieties of mangels grown in 1907 from seed which was imported. The three highest yields from Canadian Seed were: 53.6, 50.9 and 49.2 tons per acre.

Sugar Beets.

Sugar Beets are grown in Ontario both as a food for live stock and for selling to the factories for the production of sugar. With the first object in view the varieties mostly grown have roots of good size which grow considerably out of the ground and contain about 10 per cent. of sugar. When the object is sugar production, however, those varieties are grown whose roots grow almost entirely under the ground and which contain on an average about 15 per cent. of sugar. The roots of the varieties of sugar beets for sugar production are also considerably smaller than those grown for feeding the farm stock.

Varieties. In 1907, 26 varieties of sugar beets were grown at the College. Of this number, 20 have been grown for five years in succession. These include varieties which are usually grown for feeding to farm stock as well as those which have been selected for many years for the production of a high percentage of sugar. All varieties were grown in rows 21 inches apart and the roots were thinned to a distance of seven inches apart in the rows. The following table gives the yield of roots produced in 1907 and also the average yield of both tops and roots per acre in the experiments for five years.

Variety.	Tons of tops per acre.	Tons of roots per acre.	
	Average of 5 years 1903–07.	1907.	Average of 5 years 1903–07.
Giant White Feeding	3.8	19.8	**31.3**
Tankard Cream	3.1	15.3	**27.3**
Royal Giant	3.1	16.6	**26.3**
Giant Rose Feeding	2.6	17.4	**26.0**
New Danish Improved	4.1	18.1	**24.6**
Rennie's Giant Sugar	3.1	19.3	**24.0**
Imperial Giant Half Sugar	2.4	21.7	**23.9**
Hybrid Sugar Beet Mangel	3.2	20.8	**23.8**
Red Top	4.1	13.4	**22.9**
Red Skinned	3.5	14.8	**21.9**
Green Top White	5.0	17.4	**21.5**
White Silesian	5.2	14.8	**21.2**
Lane's Improved	5.1	14.8	**21.0**
Champion	7.2	14.5	**19.8**
Kleinwanzlebener	8.5	14.5	**19.7**
Improved Imperial	5.8	16.1	**18.2**
Kleinwanzlebener (Mette)	5.8	13.4	**18.0**
Jaensch's Victrix	7.0	13.9	**18.0**
Rubensamen (Rimpau)	7.1	14.2	**17.9**
French Yellow	4.2	10.7	**15.8**

It will be observed from the table that the Giant White Feeding variety of Sugar Beet gave an average yield of roots of four tons per acre more than the next highest yielding variety. The Giant White Feeding not only gave higher results in the average yield per acre at the College for 1907, but it also gave 3 tons per acre more than the Tankard Cream in the Co-operative experiments throughout Ontario in the past year. According to the analyses made by the Chemical Department at the College, the Giant White Feeding contained an average of 7.8 per cent. of sugar for six years, and the Tankard Cream an average of 8.9 per cent. of sugar for five years. The Royal Giant, which stands third in the list in yield per acre, contained an average of 9.9 per cent. of sugar and the Giant Rose Feeding 12.4 per cent. of sugar in the average analyses for six years. In comparison with this we have an average of 16.5 per cent. of sugar from the Kleinwanzlebener and of 17 per cent. from the Improved Imperial variety. These last two are grown almost entirely for sugar production.

An experiment was conducted by Prof. G. E. Day, of the Farm Department, in each of two winters by feeding mangels and sugar beets to milch cows. These two kinds of roots were found to give equal amounts of milk when equal amounts of roots were fed. It is quite probable that if each of these two classes of roots had been fed to fattening stock, a difference would have been seen in favor of the sugar beets which contained about 10 per cent of sugar, as compared with mangels which contained about 4½ or 5 per cent. of sugar.

Soaking Sugar Beet Seed Before Sowing. For five years in succession an experiment has been conducted as to the advisability of soaking sugar beet seed before sowing in order to soften the husk and hasten the germination. The experiment has been conducted in duplicate in each of five years by sowing seed which has been soaked in water for twelve, twenty-four and thirty-six hours. In each individual test one plot was also sown with seed which had not been soaked. In averaging the results for the five years' experiments, we find that soaking the seed proved beneficial in all cases. The greatest yield was given from seed which had been soaked for twenty-four hours. The average yield in this case was 15.2 tons per acre in comparison with 13.3 tons per acre from the unsoaked seed. There proved to be an advantage form soaking the seed in each year of the experiment except in 1907, in which season there appeared to be a slight disadvantage from the soaking of the seed. A similar experiment was conducted in 1906 in which mangel seed had been soaked in the same way as that described for the sugar beet seed. The results from the mangel experiment were similar to those of the sugar beet experiment. In the mangel experiment the greatest advantage, however, was obtained when the seed had been soaked for a period of 12 hours. This produced an average of 2.6 tons per acre over the yield from the unsoaked seed.

Thinning Beets at Different Distances in Drills. For five years in succession an experiment has been conducted by thinning plants two, four, six, eight and ten inches apart in the rows. This experiment was conducted in duplicate each year, and the Kleinwanzlebener, which is grown for sugar making purposes, was used throughout. The average results for the five years in yield of roots per acre are as follows: 2 inches, 17.8 tons; 4 inches, 15.8 tons; 6 inches, 15.7 tons; 8 inches, 15.6 tons and 10 inches, 15.5 tons. The study of the detailed results reveals the fact that as the distance between the plants increased there is a greater average weight per root, varying from about ½ lb. to about 1¼ lbs., but that there is also a decrease in the yield per acre from 17.8 to 15.5 tons. Of course, it must be borne in mind that, while close thinning results in larger yields of roots per acre, it involves a greater amount of work both in thinning and in harvesting the crop.

Growing Beets in Rows at Different Distances Apart. This experiment has also been conducted in each of the past five years by sowing seed in rows which were made at different distances apart. Seven rows were sown in each plot. The outside rows were discarded and only the five inner rows were taken into consideration when determining the yield of the plots. The experiment was made in duplicate each year and the Kleinwanzlebener variety was used in each experiment. The five years' results of each test in the average weight of roots and in the yield of tops and of roots per acre are as follows:

Distances.	Average weight per root. 1902-3-4-5-7.	Yield of tops per acre. 1902-3-4-5-7	Yield of roots per acre. 1902-3-4-5-7
	Lbs.	Tons.	Tons.
Rows 12 inches apart	.62	9.14	20.52
" 14 "	.65	7.57	19.19
" 16 "	.73	8.08	19.30
" 18 "	.80	8.15	18.90
" 20 "	.87	7.97	18.65
" 22 "	.94	8.28	18.44
" 24 "	.99	8.09	18.10
" 26 "	1.04	8.16	17.68
" 28 "	1.11	8.16	16.96

In Germany where the sugar beet is used very extensively for factory purposes the rows are made rather closely together, being only 18 to 20 inches apart. By having the rows fairly close together and the plants quite near to each other in the rows it is claimed that the largest percentage of sugar is obtained from the beets. Our results show that when sugar beets are grown in rows 18 inches apart there is an average yield of about 2 tons per acre more than when the rows are at a distance of 28 inches apart. The analyses of the roots made in the Chemical department at the College for five years in succession show that on the average the roots which were 18 inches apart contained 16.9 per cent. sugar and those which were 28 inches apart contained 16.8 per cent. of sugar. These results seem to indicate that in the quality of the roots the distance does not matter very materially providing the roots are cultivated carefully and are not thinned to more than seven inches apart in the row. The farmer who grows his roots in rows 18 inches apart would, however, obtain a greater money value than the man who grows his sugar beets in rows 28 inches apart, owing to the greater yield of roots per acre.

Thinning Beets at Different Stages of Growth. In thinning sugar beets at four different stages of growth in each of the five years, 1903, 1904, 1905, 1906 and 1907, it is found that the greatest average yield per acre was obtained from thinning the plants when about two inches in height. There was an average increase of 1.3 tons per acre where the roots were thinned at a height of two inches as compared with those which were thinned at a height of eight inches.

VARIETIES OF SWEDE TURNIPS.

Although the acreage devoted to the growth of mangels has been gradually increasing, that used for the growing of Swede Turnips has been slightly decreasing during the past few years. A considerable number of varieties of Swede Turnips have been grown in the Experimental department from year to year. In 1907 only five of the leading kinds were used in the Experimental department through lack of room in the grounds. The following gives the yields of roots per acre of each variety in 1907 and also in the average for the past five years: Hall's Westbury; 20.7 tons, 21.7 tons: Sutton's Magnum Bonum; 21.5 tons, 19.6 tons: Kangaroo; 21.1 tons, 19 tons: Hartley's Bronze Top; 17.4 tons, 18.9 tons: Buckbee's Giant; 17.4 tons, 18.9 tons. Unfortunately, the Carter's Invicta was not grown at the College in 1907. This is a variety which has given good results at Guelph and which was selected by several turnip exporters, who examined our crop in 1905, as being one of the most suitable of all varieties grown for the export of turnips for table use. It was used for the co-operative experiments over Ontario in 1907, and gave the highest yield per acre of those used for the co-operative work.

VARIETIES OF FALL TURNIPS.

The fall turnips are not grown extensively in Ontario as they are not of as good keeping quality as the Swede turnips. Upwards of fifty varieties of fall turnips have been grown in years past. In 1907, however, owing to the lack of room, only four prominent varieties were included in the test. The following gives the yield in tons per acre for 1907 and also the average yield per acre for six years of each of the four varieties: Red Top White Globe: 35.3, 29.1; White Egg: 28.8, 24.1; Early American Purple Top: 24.8, 22.6; and Cow Horn: 24.3, 21. In 1907, the Red Top White Globe and the White Egg varieties were distributed throughout Ontario in connection with the co-operative experiments. The average results for the co-operative experiments show that the Red Top White Globe gave decidedly the largest yield of roots per acre.

VARIETIES OF KOHL RABI.

Kohl Rabi, although grown to a certain extent in the old country as feed for sheep and other farm stock has not been grown to any great extent for farm purposes in Ontario. The kohl rabi resembles cabbage in its root and Swede turnip in its leaf. The valuable part, however, grows about three inches above the ground in the form of a bulb. It makes excellent food for domestic use and is prepared for culinary purposes in much the same way as the Swede turnip. Four varieties were grown in the Experimental Department in 1907 and three of these have been grown for six years. The following gives the yields of roots for each of the three varieties grown in 1907 and also for the longer period. Early White Vienna, 22.4, 21.3; Earliest Erfurt, 31.3, 21.1, and Goliath Purple, 22.2, 17.8 tons per acre. The Garton's Improved Long variety of kohl rabi has been grown for three years in succession, but the results are considerably below the Early White Vienna variety.

VARIETIES OF FIELD CARROTS.

Nineteen varieties of field carrots were grown in the Experimental department in 1907. Of this number, 17 varieties have been grown for five years in succession. The following table gives the yields per acre of the roots for 1907 and also the average yields for both the tops and the roots for the average of five years:

Varieties.	Tons of tops per acre.	Tons of roots per acre.	
	Average of 5 years. 1903-07.	1907.	Average of 5 years. 1903-07.
Steele's Improved Short White	7.6	44.3	**34.3**
Mammoth Intermediate Smooth White	7.8	36.4	**33.3**
Mastadon White Intermediate	6.9	39.5	**33.0**
Iverson's Champion White Intermediate	6.9	34.6	**32.3**
Carter's Hundred Ton	6.6	33.9	**31.6**
Sutton's Matchless White	8.3	36.4	**31.5**
Simmers' Short White Vosges	6.9	37.3	**30.9**
Large White Belgian	6.9	30.5	**28.3**
Large White Vosges	6.3	31.1	**27.7**
American Beauty	6.2	28.1	**27.4**
Long Yellow Stump Rooted	5.3	30.5	**27.3**
Rubicon Half Long Red	6.2	30.5	**27.3**
White Griewener	8.1	27.8	**26.6**
Carter's Gate Post Orange Long	7.4	27.3	**26.0**
Sutton's Yellow Intermediate	6.6	29.0	**25.5**
Carter's Orange Giant	7.1	28.4	**25.3**
Garton's Intermediate	4.8	22.1	**22.7**

The experiments conducted with many varieties of carrots go to show that the long, slender, deep rooted, irregular varieties which were formerly grown to a large extent are no longer desirable. During the past few years many varieties of medium length and of a good thickness have been introduced and have given excellent satisfaction. The largest yielding varieties in the table here presented belong to this latter class while the long White Belgian variety has long roots, is difficult to pull and is comparatively light in yield as compared with some of the other kinds.

Carrots from Canadian Grown Seed. As in the case of mangel seed, we also produced carrot seed at the College in 1906. The seed obtained from the different plants was sown in the spring of the present year and gave fairly good results, but not as high in comparison with the imported seed as was obtained from the Canadian grown mangel seed. The production and testing of Canadian grown root seed will likely be continued in the future.

VARIETIES OF PARSNIPS.

Although parsnips have not been used to any great extent for feeding to farm stock there are occasionally questions asked as to the advisability of growing this class of roots for farm tock. In order to obtain some information on this kind of crop, an experiment has been conducted in each of the past five years in comparing three different varieties. The results are very similar and are as follows for the five year period: New Ideal Hollow Crown, 11.9; Buckbee's New Sugar, 11.7 and Sutton's Cattle, 11.3 tons of roots per acre per annum. It will therefore be seen that the production from the parsnip is not nearly as large as that from the mangel, the turnip or the carrot.

Storing of Roots.

In each of the past few years mangels, sugar beets, turnips and carrots have been pitted in the field, stored in the root cellar and packed in boxes in sand in order to get some information regarding the proper methods of keeping roots, but we are as yet unable to give a satisfactory report regarding the pitting of roots in the field. It seems difficult to pit a small quantity and have them under the same conditions as when large quantities of roots are used. In the other methods of storing, however, we find that we can obtain as good results when the roots are stored in a cool cellar as when they are packed in sand, but in the latter there is less mould and sprout than those stored loosely in the cellar.

Varieties of Corn for Fodder and the Silo.

In many parts of Ontario, those farmers who planted a good sized field of corn in 1907 and who cultivated it carefully throughout the season, mostly obtained a large amount of valuable feed, even in those districts where the rainfall was very light and where the pasture and the hay crops were almost a failure. Although the acreage devoted to corn in Ontario in 1907 was larger than for a year or two previous, it is quite probable that corn will be cultivated still more extensively in 1908. There are scarcely any parts of Ontario in which some one or other variety of corn will not thrive satisfactorily, unless it is in the Northern districts. Even beyond the limits where it was thought that corn could be grown, certain varieties have been cultivated and even ripened with a considerable amount of satisfaction. It is of the greatest importance, however, to grow those varieties which are particularly suited to the localities in which they are grown. It is important for each farmer to do a certain amount of experimental work for himself. Before doing so, however, he will find very great assistance from results of experiments which we have conducted at the College with a large number of varieties, where not only the total yield per acre but also the yield of ears, the stage of maturity, etc., are taken into consideration. The variety test conducted at this Station should serve as a general guide to the farmers in most parts of Ontario, indicating to them the kinds which are likely to be suitable for their respective localities. It is indeed difficult to mention individual varietes of corn which are pre-eminently suited to Ontario. The requirements of the different localities are so very different that it seems necessary to give the results of a large number of varieties which can be studied by individual farmers, if the greatest value from the experiments is to be obtained. We therefore present the average of five years' results in growing fifty-seven varieties of corn under uniform conditions. The varieties in the list are arranged according to the total yield of green corn per acre. For these experiments, the corn was usually planted within the last ten days of May and it was harvested about the middle of September. Immediately after the crop was cut, the ears were husked, weighed, counted and examined. The stage of maturity of the corn is indicated by the condition of the grain at the time it was harvested. The seven terms which were used to describe the ripeness of the corn at the time of husking were as follows: Water, early milk, milk, late milk, dough, firm dough and ripe. The average results of the five years' experiments are as follows:—

VARIETIES OF CORN FOR FODDER AND THE SILO.

Varieties.	Description of varieties.		Average results of five years' experiments.					
	Class of corn and color of grain.	Average number of rows per ear, 5 years.	Condition of grain when harvested.	Number of days until in full tassel.	Height of plants.	Weight per ear.	Yield per acre.	
							Husked ears.	Total crop green.
					Inches.	Ounces.	Tons.	Tons.
Pennsylvania Early Dent	Yellow Dent	20	Early Milk	106	131	7.24	3.04	27.37
Pedrick Perfected Golden Beauty	Yellow Dent	12	Early Milk	105	127	6.24	2.57	26.87
New Century Wonder	Flour	12	Water	112	118	2.68	.82	26.77
Eureka	Yellow Dent	16-18	Early Milk	102	126	8.87	3.75	25.78
100-day Bristol	Yellow Dent	14	Milk	102	125	7.17	3.50	25.34
Kansas Sunflower	Yellow Dent	16	Early Milk	105	126	5.34	2.55	24.17
Landreth's Large White Flint	White Flint	12	Early Milk	104	127	5.73	2.67	23.68
King of Illinois	Yellow Dent	20	Early Milk	104	126	7.27	2.97	23.49
Cloud's Early Yellow	Yellow Dent	20	Milk	102	123	8.31	3.68	22.96
Darke County Mammoth	Yellow Dent	18	Milk	100	121	8.93	4.29	22.96
Lenocher's Homestead	Colored Dent	16	Milk	96	114	8.60	4.13	22.58
Mastadon Dent	Yellow Dent	18-20	Milk	101	122	8.21	3.60	22.42
Salzer's North Dakota	White Flint	8	Dough	90	100	6.58	4.26	22.38
Triumph Sugar	Sweet	12	Late Milk	94	92	7.06	4.30	22.24
Marblehead Mammoth	Sweet	12	Milk	95	95	7.64	4.11	22.08
Early Butler	Yellow Dent	14	Milk	95	115	7.45	3.98	21.56
Golden Triumph	Yellow Dent	16	Early Milk	100	117	7.02	3.01	21.37
Indiana Wonder	Sweet	12	Milk	94	101	5.08	3.47	21.22
Late Mammoth	Sweet	12-14	Milk	100	99	7.32	3.44	21.14
Rennie's Early Giant White Dent	White Dent	14	Milk	97	111	8.17	3.88	21.05
Burlington Hybrid	White Flint	8	Dough	92	96	5.31	3.99	21.01
Reid's Yellow Dent	Yellow Dent	16	Late Milk	96	116	8.66	3.97	20.96
Mammoth Cuban	Yellow Dent	18	Milk	96	113	7.80	3.84	20.94
Snow White Dent	White Dent	16	Milk	97	114	8.52	3.95	20.81
Tuscarora	Flour	8	Late Milk	89	92	7.39	4.50	20.65
Wisconsin Earliest White Dent	White Dent	14	Milk	99	110	7.53	3.46	20.57
Early Mammoth	Sweet	12	Late Milk	96	93	7.54	3.95	20.49
Profit	Yellow Dent	16-18	Milk	99	118	8.38	3.59	20.45
Compton's Early	Yellow Dent	12	Firm Dough	88	101	8.58	4.40	20.41
Stowell's Evergreen	Sweet	14-16	Milk	97	95	6.73	3.47	20.21
Lowe's Perfection	Sweet	12	Late Milk	91	89	7.49	4.61	20.18

Rennie's Improved Leaming	Yellow Dent	18	Milk	101	116	7.44	2·91	19·84
Longfellow	Yellow Flint	8	Firm Dough	88	96	6.43	3·76	19·78
Iowa Silver Mine	White Dent	14	Early Milk	100	115	7.50	3·47	19·74
King Phillip	Colored Flint	8	Firm Dough	87	97	6.44	4·05	19·67
Wisconsin Yellow Dent	Yellow Dent	16-18	Milk	97	111	7.72	3·76	19·63
Mammoth Southern Sweet	White Dent	14	Milk	100	116	7.14	3·04	19·57
King of the Earlies Dent	Yellow Dent	14-16	Late Milk	93	109	7.07	3·53	19·49
Improved Leaming	Yellow Dent	16-18	Milk	99	114	7.76	3·11	19·48
Potter's Excelsior	Sweet	12	Late Milk	94	87	5.78	3·86	19·13
Canada Yellow	Yellow Flint	8	Firm Dough	89	99	7.44	3·80	18·74
Hickox Sweet	Sweet	12	Milk	96	91	7.28	3·46	18·17
Clarke's Cuban Giant	White Dent	16	Early Milk	105	120	6.33	2·17	18·15
White Cap Yellow Dent	Yellow Dent	16	Late Milk	96	109	7.75	3·34	18·15
Pee and Kay	Sweet	12	Dough	86	80	6.51	4·29	17·99
Red Blazed	Colored Flint	8	Ripe	85	95	7.04	3·89	17·72
Wisconsin Beauty	Sweet	12	Late Milk	89	80	8.09	4·69	17·41
Genesee Valley	Yellow Flint	8	Firm Dough	86	94	7.09	3·25	17·11
Black Mexican	Sweet	8	Dough	92	84	4.51	3·76	16·45
University No. 13	Yellow Dent	16	Dough	88	102	8.16	4·00	16·35
Kendal's Early Giant	Sweet	12	Dough	85	73	7.20	4·36	14·97
Perry's Hybrid	Sweet	12	Dough	87	76	7.49	3·84	14·96
Farmer's Surprise	Yellow Flint	8	Firm Dough	86	89	6.62	2·90	14·92
Wisconsin Little Dent	Yellow Dent	14	Firm Dough	81	96	8.55	4·14	14·39
Early Minnesota	Sweet	8	Dough	84	71	5.08	3·50	14·30
Ford's Early	Sweet	8	Dough	81	71	5.80	3·84	13·80
Farmer's Friend	Yellow Flint	8	Ripe	82	72	5.79	2·86	13·12

In 1907 the corn did not mature at Guelph nearly as well as it did in 1906. It should be remembered that the corn was husked immediately after it was cut. If the grain had been cut and shocked in the field for a time before it was husked, which is usually the practice on the farm, the grain, undoubtedly, would have ripened fairly well, even in some of the varieties which are here reported as being in the firm dough and in the dough condition. This information should be taken into consideration when studying the stage of maturity of the different varieties as presented in the tabulated results. When examining the results of experiments conducted at Guelph with the corn crop it should be remembered that the experiments have been conducted in a locality which is eleven hundred feet above the sea level and eight hundred and fifty feet above Lake Ontario and in latitude north 43°-38', also that Guelph is about 38 miles inland from the lakes. Keeping these considerations in view a large amount of valuable information can be gleaned from the figures presented in the table.

From the report here presented it will be clearly seen that the various kinds of corn possess many variations in productiveness and in the method of growth. We notice variations from 13 to 27 tons of total crop per acre, from $\frac{4}{5}$ of a ton to 4 $\frac{3}{5}$ tons of ears per acre, from 2 $\frac{5}{8}$ to nearly 9 oz. in the average weight per ear, from 8 to 20 rows per ear, from 71 to 131 inches in height of varieties and from the water to the ripe condition of the grain at the time that the corn was cut. Between these extremes we have a great many intermediate stages. In selecting a variety of corn for the silo, one should be chosen which furnishes, not only a large total yield, but which is likely to reach a good stage of maturity in the locality where it is grown before the severe frosts appear in the autumn. From a study of the table the superiority of one variety over another for any definite purpose is quite manifest. In order to illustrate this point allow me to draw the attention of the reader to the superiority for a silo of Hendersons' Eureka as compared with the New Century Wonder; Cloud's Early Yellow or the Mastadon Dent with Rennie's Improved Leaming; and the Salzer's North Dakota with the Canadian Yellow. The reader can in a similar manner make many comparisons between the different varieties and thus determine for himself the most promising kinds for him to test on his own farm in order that he may find out the variety which will best meet his requirements.

Eight different strains of the White Cap Yellow Dent corn have been obtained from different growers who have been continuously selecting seed and who have been growing the same variety of corn on their farms in Essex, Elgin and Middlesex. Some of these have been tested on the Experimental Grounds for two and some for three years in succession. The results are quite interesting and show quite a variation among the different strains. The greatest yields of total crop have been produced from seed obtained from Mr. H. Smith of Elgin County. Mr. C. Weigle and Mr. C. F. Knight of Elgin County and from Mr. E. M. Zavitz of Middlesex County. The corn of Mr. Smith and Mr. Weigle was, however, quite late in ripening. The greatest yield of grain per acre was produced from seed obtained from Mr. C. F. Knight of Essex County and from Mr. E. M. Zavitz, Middlesex County.

SORGHUM FOR FODDER.

We include, under Sorghum, a number of classes as well as a number of varieties of crops which are grown quite extensively in some of the States of the American Union, but only as yet to a very limited extent in Ontario. We include under this heading different varieties of sugar cane, broom corn, kaffir corn, millo maize, etc. Some of these are used principally for the production of syrup, others for furnishing material for the manufacture of brooms and whisks, and others almost entirely for the production of food for culinary purposes, etc. All of the varieties, however, are more or less valuable as producers of food for farm animals. As a food for stock, the sorghums may be used as green fodder, as silage, as dry fodder, or as pasture. The sorghums practically all thrive well in a comparatively dry, hot season, when corn makes a slow growth. At the College, none of the varieties have been used for silage and only one, viz., the Early Amber Sugar Cane, has been used extensively for pasture purposes. For the production of fodder, however, no less than sixteen varieties were under experiment in 1907. Of this number, fifteen varieties have been grown in the Experimental department for at least six years in succession. The seed is planted each year in squares by placing about five seeds in a place and allowing 3½ links (26 2-5 inches) between the different plantings. When the sorghum is about five inches in height, some of the plants are removed, allowing three to remain in each place. The sorghum is cultivated in about the same way as corn. All the varieties were cut in October before being injured by frost. The folowing gives the height, the yield of heads, and the total yield of green crop per acre of each variety for 1907 and for the average of six years.

Varieties.	Height.		Yield of heads per acre.		Total yield per acre.	
	1907	Average 6 years 1902-07.	1907	Average 6 years 1902-07.	1907	Average 6 years 1902-07.
	inches	inches	tons	tons	tons	tons
Orange Sugar Cane.........	114	101	.5	.4	20.8	21.0
Early Minnesota Sugar Cane	116	107	.8	1.0	13.0	19.1
Early Amber Sugar Cane...	108	97	1.5	1.1	17.8	18.6
Fodder Sugar Cane.........	119	101	.9	.9	19.6	18.2
Folger Sugar Cane	118	102	.6	.6	17.4	16.7
Kenney's Improved Amber Sugar Cane..............	122	105	.3	1.0	24.2	16.2
Kaffir Corn................	80	68	.5	.6	12.9	13.7
Cal. Golden Broom Corn...	128	116	1.7	1.8	12.5	12.8
Early Jap. Broom Corn	118	112	1.7	1.8	11.4	11.8
Im. Evergreen Broom Corn	115	113	1.6	1.5	11.7	11.3
Dwarf Broom Corn	120	111	2.4	1.9	12.4	11.0
Yellow Millo Maize........	86	73	.9	.8	12.2	10.5
Australian Broom Corn	107	95	2.2	1.7	8.7	9.4
Brown Dhoura Corn	76	71	1.0	.8	13.5	8.5
Jerusalem Corn............	74	65	.7	.8	5.3	8.5

From the table here presented, it will be seen that all of the varieties of sugar cane gave a greater yield of green crop per acre than any of the other sorghuns under experiment. The Early Amber sugar cane, which is probably the best known variety throughout Ontario, gave an average of 18.6 tons. which is third in the list in the production of green fodder. The Kenney's Improved Amber sugar cane, although the tallest variety, gave the lowest yield of green crop of the different varieties of sugar cane which were included in the experiment. The record of this variety in 1907, however, was exceptionally high, being upwards of 24 tons of green fodder per acre. The Kaffir corn, on behalf of which extravagant claims are sometimes made through the public press, stands seventh in yield of green crop per acre and has given an average of 7.3 tons per acre per annum less than the Orange sugar cane. The Early Amber variety is comparatively early and can usually be ripened satisfactorily on the warmer soils of the Province. It is rather earlier than the Orange sugar cane and is about the same in this respect as the Early Minnesota variety.

SUNFLOWERS FOR FODDER.

A few years ago, considerable was said regarding the advisability of growing sunflowers and using the heads for cutting with corn for the silo. The crop has never come into general use for this purpose, although it is grown to a limited extent on some farms throughout the Province. Seven varieties were grown in the Experimental department for several years in succession and careful notes were made regarding the productiveness and the growth of the different kinds. Ultimately, all the varieties but three were discarded. These have now been grown for twelve years in succession. The following table gives the height and the yield of heads and of total green crop per acre for 1907, and for the average of twelve years.

Varieties.	Height.		Yields of heads per acre.		Total yield per acre.	
	1907.	Average 12 years.	1907.	Average 12 years.	1907.	Average 12 years.
	inches.	inches.	tons.	tons.	tons.	tons.
Black Giant	99	99	6.3	6.0	21.5	20.6
Mammoth Russian	89	93	5.7	5.5	16.7	16.4
White Beauty*	85	84	6.1	5.8	17.9	16.3

* Grown for ten years only.

The Black Giant has not only produced the greatest total yield per acre, but it has also furnished the tallest plants and the greatest weight of heads. In size of heads, however, the Black Giant is rather the lowest, the following being the average diameter of the heads of each variety in the results for seven years: Black Giant, 7.3 inches; Mammoth Russian, 7.5 inches; and White Beauty, 7.6 inches.

VARIETIES OF MILLET FOR GREEN FODDER AND FOR HAY.

Millet is grown extensively in Siberia, India, Japan and China, where the seed is used largely as a human food. It is estimated that the seed of millet in one form or another is used as a portion of the food of fully one-third of the inhabitants of the globe. In Ontario, however, its general use is for the production of green fodder or of hay. Some farmers grow millet more or less extensively as a regular crop, but as a rule it is sown to supplement some other crop, which, for some cause or other has proven a partial failure. It is found that in some seasons the amount of rainfall is so abundant during the latter part of May and the early part of June, that it is impossible to get corn planted in good condition, in which case the land can frequently be used to good advantage in growing millet, as it does not require to be sown until comparatively late in the season. In this way the loss of the corn crop would not be felt so seriously as it would have been had not a fodder crop been secured from the land. It will therefore be readily seen that the millet crop is frequently an important one for the farmers of Ontario, as it can be used very readily when other coarse fodder is apt to be deficient.

Previous to 1902 upwards of thirty varieties of millet had been grown under experiment at the College, for the purpose of gaining information as to the most suitable kind for cultivation in this Province. At that time it was reported that for the average results for eight consecutive years the highest yields of green crop were produced from the Golden Wonder, Holy Terror Gold Mine, Japanese Panicle, Japanese Barnyard, and Magic varieties. In 1902, and since that date, fifteen varieties have been grown in each of the six years, the results of which are embodied in the accompanying table.

Varieties.	Height (ins.)		Tons per acre.			
			Green fodder.		Hay.	
	1907	Average 6 years 1902-07.	1907	Average 6 years 1902-07.	1907	Average 6 years
Golden Wonder	30	36	6.5	9.3	3.1	4.1
Japanese Panicle	40	44	7.1	9.6	3.5	4.0
Holy Terror Gold Mine	28	35	6.6	8.8	3.2	4.0
Magic	33	36	6.7	8.6	3.3	3.9
Common	29	34	5.2	7.5	2.6	3.4
Japanese Common	31	34	7.9	8.7	3.5	3.2
Hungarian Grass	27	33	6.7	8.2	2.9	3.2
Siberian	30	34	6.3	7.8	2.9	3.0
Japanese Barnyard	25	40	4.0	8.6	1.7	2.9
California	28	34	5.2	7.8	2.5	2.9
Early Harvest	31	36	5.1	7.3	2.4	2.9
German or Golden	28	34	5.1	7.3	2.4	2.7
Hog	40	39	5.3	7.0	2.7	2.5
White French	30	34	4.3	5.4	1.9	2.0
Red French	24	27	3.9	4.5	1.4	1.4
Steel Trust	26	....	5.8	....	2.9	....
Early Fortune	21	....	3.3	....	1.4	....

It will be seen that most of the varieties which gave the highest yields of green fodder per acre in the eight years previous to 1902, also occupy highest places in yield of green fodder in the average results for the past six years. In hay production, the Golden Wonder, Japanese Panicle and

Holy Terror Gold Mine, each produced fully four tons per acre per annum. The Common millet gave three-fifths of a ton and the Hungarian grass four-fifths of a ton per acre less than the three highest yielding varieties. The Japanese Panicle is probably the most popular variety amongst the newer sorts which have been tested by the farmers throughout Ontario. It grows to a good height, stands up remarkably well, has a good leaf development, and is relished well by farm stock. It is a good producer of seed as well as a heavy yielder of green fodder and of hay. There has evidently been a great misunderstanding amongst seedsmen as to the different varieties of Japanese millet, as a number of the seedsmen in advertising the Japanese millet have illustrated one variety and have described another variety which is entirely different. It should be clearly understood that the seed of the Japanese Panicle variety is of dark reddish brown color and is very smooth and shiny, which is quite different in appearance from the seed of the Japanese Barnyard millet. The Steel Trust and the Early Fortune millets, which were grown in 1907 for the first time, gave comparatively low yields of hay.

DATES OF SOWING MILLET.

In each of the past two years an experiment has been conducted, in order to glean some information as to the best time to sow millet seed for the production of green fodder and hay. For this experiment, the Japanese Panicle, the Japanese Barnyard and the Hungarian Grass were the varieties used. The first seeding took place in each year on the 2nd of May and the succeeding seedings every half-month, until in all seven sowings were made. It was difficult to make hay out of the crops produced from the late seedings, especially in the case of the Japanese Panicle variety. The folowing table gives the average yield of green crop per acre produced in 1906 and in 1907 by each of the varieties from the different dates of seeding.

Dates of seeding.	Average number of tons of green crop per acre.			
	Japanese Panicle.	Japanese Barnyard.	Hungarian Grass.	Average 3 varieties.
May 2nd	8.82	8.00	6.78	7.87
May 15th	8.56	8.24	7.14	7.98
June 1st	10.80	9.32	7.40	9.17
June 15th	10.68	8.84	7.66	9.06
July 2nd	9.60	9.48	8.18	9.09
July 15th	10.68	8.48	8.40	9.19
August 1st	....	....	4.28	....

It will be seen that there is a possibility of sowing each of these varieties of millets at too early a date to give the most satisfactory returns. The highest average yield of green crop per acre was produced by the Japanese Panicle millet when sown on the 1st of June; from the Japanese Barnyard millet, when sown about the end of June; and from the Hungarian Grass, when sown about the middle of July. The average results of the three varieties of millet tested on the different dates for two years in succession are practically equal as far as yield per acre is concerned, for all of the seedings from the first of June until the 15th of July. The crops produced from the seed which was sown in May were light, and those from August were very poor. This experiment will likely be continued in the future in order to obtain results throughout a greater series of years.

Rape, Kale, Cabbage, Etc.

Rape, for pasture purposes, is quite well and favorably known by some of the stock men throughout Ontario. Other somewhat similar crops, however, such as the large feeding cabbages, the different kinds of kale, the cultivated mustards, etc., are not so well known and have been but little grown in Ontario. Some of these are used more extensively in Great Britain. In 1907, no less than thirty varieties representing this class of crops, were grown in the Experimental department. Of this number, twenty-eight have been under experiment for four years and thirteen varieties for eight years in succession. The crops have all been sown in rows 3⅓ links (26 two-fifths inches) apart. Each plot was exactly one-hundredth of an acre in size, consisting of three rows each four rods in length. The seed was sown at the rate of 2.2 pounds per acre. In order to give all varieties an equal chance, the plants in the rows were thinned to exactly two inches apart in every case. The land between the rows was cultivated occasionally throughout the early part of the growing season. The usual time of seeding is about the middle of June, the date in 1907 being June 18th. When the crops had reached about their best condition for feeding in the autumn, each crop was cut with a scythe and weighed in the green condition. The crop is usually fed either to sheep or to hogs and sometimes to young cattle. In England, the cabbage seed is frequently sown in the garden or in hot beds and the young plants are transplanted in the field at sufficient distances apart to produce large heads of cabbage. This, however, requires a greater amount of labor, which is an important item in connection with agriculture in Ontario at the present time. In this experiment the different varieties of cabbages have been treated in exactly the same way as the different varieties of rape and kale. The heads of cabbage have, therefore, been quite small, the growth being mostly leaf and stem. The quality, however, of these crops appears to be very good. The following gives the average yield per acre of thirteen varieties grown for eight years in succession:—

Sutton's Earliest Drumhead Cabbage	24.8	tons per acre.
Thousand Headed Kale	22.6	"
Dwarf Victoria Rape	21.0	"
Dwarf Essex Rape	20.7	"
Sutton's Earliest Sheepfold Cabbage	20.0	"
Purple Sprouting Broccoli	19.7	"
Marrow Collards	19.1	"
Hardy Curled Kale	18.8	"
Sutton's Best of all Savoy Cabbage	18.7	"
Jersey Kale	17.8	"
Tall Green Curled Scotch Kale	15.9	"
Sutton's Latest Drumhead Cabbage	14.9	"
Brussels Sprouts	14.5	"

As the results for the past four years included several varieties which were grown in 1904 for the first time, we also present a table giving both the height and the yield of green fodder per acre for 1907, and for the average of the past four years.

Varieties.	Height (ins.)		Tons of green fodder per acre.	
	1907	Average 4 years 1904-07.	1907	Average 4 years 1904-07.
Sutton's Earliest Drumhead Cabbage	20	19	42.0	29.6
Thousand Headed Kale	43	35	41.4	27.1
Sutton's Giant Drumhead Cabbage	21	21	35.2	26.4
Sutton's Earliest Sheepfold "	19	18	33.3	25.2
Large Seeded Umbrella Rape	32	27	35.0	24.7
Large Seeded Common Rape	36	30	34.8	24.4
Large Seeded Yellow Flowering Rape	37	28	38.3	24.1
Marrow Collards	26	24	30.8	23.0
Sutton's Best of All Savoy Cabbage	22	19	31.0	22.5
Dwarf Essex Rape	40	28	33.1	22.1
Dwarf Victoria Rape	37	29	37.3	22.0
Buckbee's Wonderful Dwarf Bonanza Rape	37	30	36.0	21.9
Large Seeded White Flowering Rape	39	30	31.4	21.6
Purple Sprouting Boroccoli	36	31	28.2	21.3
Sutton's Drumhead Cabbage	19	19	28.6	20.9
Cabbage Leaf Rape	41	32	33.8	20.5
Hardy Curled Kale	34	27	29.9	20.3
Jersey Kale	37	32	27.0	19.8
Tall Green Curled Scotch Kale	36	29	26.2	19.3
Sutton's Latest Drumhead Cabbage	23	20	26.8	18.9
Brussel's Sprouts	31	26	21.5	17.1
New Chinese Mustard	78	62	21.6	16.6
Bloomsdale Large Leaf Mustard	80	61	21.5	16.4
Southern Giant Curled Mustard	66	52	22.5	14.5
White Mustard	63	57	20.0	13.9
Creole Mustard	67	53	18.8	13.5
Brown Mustard	75	60	15.3	10.0
German Rape	20	30	8.0	5.9

It will be observed from the table giving the average results for four years, that of the four highest yielding varieties, three of them were cabbages. It will be seen that the Sutton's Earliest Drumhead cabbage gave an average of exactly 7½ tons per acre per annum more than the Dwarf Essex Rape. It will also be observed that the Dwarf Essex, and the Dwarf Victoria, and the Buckbee's Wonderful Dwarf Bonanza rape gave very similar results, and their appearance as well as their comparative yields are very similar. It will also be noticed that all the mustards have given comparatively low yields per acre, as they come in a group at the bottom of the list, with the exception of the German rape, which produced the lowest yield of all the varieties under experiment. It should be remembered that the German rape, as well as the different varieties of mustard, are annuals rather than biennials, thus coming into bloom in the same year in which the seed is sown, and are in this respect quite different from the other varieties included in the list here presented which produce leaf and stem but no bloom the first year.

Two other varieties; viz., the Dwarf Holstein and the World Beater cabbage, were grown in 1907 for the first time, the former giving a yield of 28 and the latter a yield of 42 tons of green crop a per acre. It will, therefore, be seen that the World Beater variety of cabbage, which was grown in 1907, gave equally good results with the Sutton's Earliest Drumhead cabbage, which stands at the head of the list in the average results of twenty-eight varieties for four years, as well as of thirteen varieties for eight years.

LEGUMINOUS CROPS FOR GREEN FODDER.

Eighteen varieties of leguminous crops were grown in the Experimental department in 1907 for the production of green fodder. They include vetches, soy beans, cow peas, lupines, etc. Most of the varieties in each of these classes require a fairly long season for growth and are more suitable for a warmer climate than that of Ontario. Owing to the peculiar weather conditions of the past season, the results were unusually low and somewhat peculiar. The greatest yields of green crop in 1907 were produced as follows: Medium Green soy beans, 6.9 tons; Ito San soy beans, 5.6 tons; Grass peas, 5.4 tons; Hairy vetches, 4.3 tons; and Parnell's Prolific cow peas, 4 tons per acre.

As six of the varieties belonging to this class have been grown in each of the past seven years, the average results for those seven years are of decidedly greater value than the results for 1907. The following table gives the average height and the average yield of green fodder per acre for each of the six varieties of leguminous crops, grown for seven years in succession.

Medium Green Soy Beans	34 inches	9.4 tons.
Hairy Vetches	33 "	8.2 "
Grass Peas	37 "	7.3 "
Early Yellow Soy Beans	26 "	7.2 "
Wonderful Cow Peas	17 "	6.0 "
Whip-poor-will Cow Peas	15 "	5.2 "

The Hairy vetches can either be sown in the autumn or in the spring of the year. It is rather difficult to grow seed of the Hairy vetches in Ontario, and as most of the seed is imported from Germany it is rather expensive, frequently costing five or six dollars per bushel. The Early Yellow Soy Beans generally ripen well in Ontario and yield about 18 bushels of grain per acre, the grain being exceedingly high in nutritive properties.

RED CLOVER.

Red Clover is to Ontario what Alfalfa is to some of the Western States. and the Cow Pea to the Southern States of the American Union. Ontario farmers should be very careful to make the best possible use of the red clover in connection with their short rotations. It is a plant of exceedingly great value, as it produces heavy crops of exceptionally nutritive material for farm stock, and also assists largely in the improvement of the soil by appropriating free nitrogen of the atmosphere, securing valuable fertilizing elements from the subsoil, and by greatly improving the mechanical condition of the soil at the surface. In some respects there is no other plant which can exactly take the place of clover on the farms of Ontario. Great care, therefore, should be taken in the endeavour to make the conditions very favorable for a good catch of clover when the seed is sown. On some farms in Ontario, it seems as though grain crops have been grown so extensively that the humus in the soil has become very deficient, and that it is now difficult to secure a good growth of clover. I believe, however, it is still possible to bring practically every farm in Ontario into that condition in which the red clover can still be grown successfully, unless in exceptional years when the crop becomes destroyed through unfavorable conditions of the weather.

In order to secure information regarding the different strains of red clover, no less than thirty-four different lots were obtained and were sown in duplicate in the Experimental department. These were obtained from different parts of the world through different sources. A large number were obtained through the Department of Agriculture at Washington: others were obtained through the seed branch of the Department of Agriculture at Ottawa, and others were obtained direct by the Experimental department at the College. These clovers included different strains of both the Common Red and the Mammoth Red varieties. The results of the experiment show that of the foreign strains, the highest yields of hay were produced from seed obtained from Ufa and from Orel, both in Russia. The Orel, which was also tested along with a number of other varieties at several of the American experiment stations through the co-operation of the United States Department of Agriculture, gave very good results indeed. In fact, the records were so satisfactory that the Bureau of Plant Industry of the Department of Agriculture at Washington, issued a special bulletin entitled: "A New Type of Red Clover." In regard to this clover, I make the following quotations from the bulletin referred to:

"In the course of an extensive experiment with seed from different sources, there appeared a variety, hitherto not used in the United States, possessing certain advantageous qualities which make it desirable to introduce it into American farming. The seed of this variety was secured from the "black earth" region in the Eastern part of the Orel Government of Russia. The soil and climate of this section resemble strikingly those of our North Western prairie country.

"This variety is distinguished by the dustlessness of its hay, due to almost complete absence of hairiness from all parts of the plant, by its heavy yields for the first crop, by its leafiness and the persistence of the basal leaves, by the succulence of the stems, which improves greatly the quality of the hay and reduces the waste, due to woody inedible portions, by greater palatability than hay from domestic seed, and by the fact that it comes to proper maturity for harvesting from ten days to two weeks later than the ordinary American red clover. Except in certain sections and for certain purposes, this variety is not recommended for supplanting domestic red clover, but rather for supplementing the latter. Although the hairless Orel clover can be readily distinguished from the American form on the field, there is no apparent difference in the seed."

We learn that the temperature and the rainfall for the summer months at Orel, Russia, are very similar to those of Ontario. The Orel clover in the experiments at Guelph resembles quite closely the variety which has been grown more or less in this Province under the name of Mammoth Red. The Orel clover, however, appears to be rather more hardy than any other strain of clover which we have tested at Guelph. There were still a few living plants in the summer of 1907, which was the fourth season after the seed was sown. We are pleased to state that we obtained a small quantity of seed from the plants which were still surviving this season. We expect to sow this seed in the spring of 1908 and shall watch the results with interest. We also received fresh seed through the Department of Agriculture in the spring of 1907 and have now some very fine plots of both the Orel and the Ufa clovers, which should give us some interesting results in 1908.

Lucerne or Alfalfa.

The cultivation of Lucerne throughout Ontario is probably increasing from year to year. In those sections of the Province where it can be grown successfully, it is an exceedingly important crop. It probably thrives best on a deep rich loam which contains a fair percentage of lime and which is either naturally or artifically well under-drained. It will generally thrive well, however, on soil of almost any character, providing the subsoil contains no stagnant water. We have sown lucerne seed in an experimental way at the College in each of fully twenty years. The catch is nearly always good and the crop grows quite satisfactorily. We have sown lucerne both alone and with a nurse crop with good success. Although we have had good catches when the lucerne seed has been sown with winter wheat, spring wheat, oats and barley, we generally prefer to sow with about a bushel of barley per acre as a nurse crop. When sown without a grain crop the plants should be cut at a good height two or three times during the summer and the material should be allowed to remain on the land. No hay should be made from lucerne during the first year unless the growth is exceptionally large. We have sown lucerne seed both in the autumn and in the spring of the year, but have in practically all cases obtained the best satisfaction from the spring sowing. We prefer using about twenty pounds of lucerne seed per acre.

On several occasions we have tested untreated seed with that which was treated with the nodule forming bacteria, but have as yet observed no perceptible advantage from innoculation. This is probably owing to the fact that the soil already contains a sufficient quantity of the living organisims.

The lucerne crop is used for green fodder, for hay, and sometimes for pasture. It is an admirable crop to use for green fodder or hay, as it supplies a large amount of feed of excellent quality. It should always be cut, however, before more than one-tenth or at most one-third of the blossoms have made their appearance. At this stage the crop produces its maximum amount of valuable food constituents, after which it rapidly deteriorates both in digestibility and in palatability. When lucerne is grown alone for pasture purposes, great care should be exercised when first turning on the animals in order to prevent bloating. It is always wise to avoid pasturing lucerne close to the ground as the crop is easily ruined by close grazing, as the root crowns of the plants are quite prominent and are easily eaten off by the animals, especially on soils that cause the plants to heave. In the spring of 1905, lucerne seed from various countries of the world was obtained through the Department of Agriculture at Washington. This seed, along with other strains obtained in Ontario and the United States, were sown in the spring of the year, and the growth from each was carefully examined and weighed in each of the past two years. Some of the strains proved to be entirely valueless for Ontario, while others gave very promising results. The seed obtained from Khiva, Samarkand and Sairam of the Eastern countries, and from Texas, Northern Montana and Nebraska of the States of the American Union, furnished the highest yields of hay per acre. This experiment will likely be followed up from year to year with the object of securing seed from that source which is likely to furnish the very best results. Turkestan alfalfa grown from seed obtained in our own markets has not as yet given very good satisfaction at Guelph, even though it has been very highly recommended in some parts of America.

The results of all the work conducted at the College show that over a series of years we usually obtain about twenty tons of green lucerne, or about five tons of hay per acre per annum. With care, the crop can be cured so as to furnish a large amount of hay of excellent quality.

TIMOTHY.

Timothy has been grown in Ontario very extensively for the production of both hay and pasture. As a pasture crop, however, it gives very poor results in a hot, dry time in the summer when the pasture is needed the most.

A large amount of experimental work has been conducted at the College in comparing Timothy with other grasses, such as Meadow Fescue, Orchard grass, Tall Oat grass, Awnless Brome grass, Meadow Foxtail, Red Top, Canadian Blue grass, Kentucky Blue grass, etc., and the reports have been presented from time to time. For the first time in 1907, however, an experiment was started in order to ascertain the comparative results of different strains or varieties of timothy. Several years ago Dr. Hopkins, formerly of the Agricultural Experiment Station at Morgantown, West Virginia, carried on some very extensive work in starting new strains of timothy from selected plants. From a very large number of selections which Dr. Hopkins made, he finally chose three as among the very best for fulfilling certain requirements. These Timothys are now being more extensively tested at the Arlington Experimental Farm near Washington, and the results are promising. It is claimed that one of the timothys ripens early and is very suitable for sowing with red clover, as the two crops reach the proper stage for cutting at about the same time. Another strain is said to be particularly suitable for pasture purposes, and still another is supposed to be a particularly heavy yielder. When in Washington in the autumn of 1906, I secured a small quantity of seed of each of these strains and in the spring of the present year we sowed each kind in duplicate plots. The germination was very good and the plots are quite promising. We shall watch with interest the results of these three strains, viz., Early Timothy, Pasture Timothy, and Stewart's Mammoth Timothy, in comparison with the ordinary variety which has been grown in Ontario so extensively for many years past.

Annual Pasture Crops.

Although an average of about seventy thousand acres is added annually to the pasture lands of Ontario, it is quite probable that the pasture crops in 1908 will be inadequate to furnish the desired amount of pasture. Many farmers seed their grain crops with Timothy and Common Red clover with the expectation of using the crop for hay and for pasture for a period of two years, and then of plowing the land for some other crops. Owing to the scarcity of labor, however, the sod is often allowed to remain several years before being plowed, and as a result, many of the pastures of Ontario are principally Timothy sods of four, or five, or six years' standing. In dry seasons, the Timothy forms a very poor pasture crop. This fact was realized in many parts of Ontario during the dry season of 1907. In some sections of Ontario farm stock had to be sold at exceedingly low prices, owing to the deficiency of pasture and of fodder crops. Great care should be taken in the spring of the coming year to furnish a considerable amount of rough feed, in order to prevent a re-occurrence of the experience of the past season. A good supply of corn should be planted, and mixed grains for either green or dry fodder should be sown. It is also quite possible that a number of farmers may wish to sow some crop in the spring of the year which would furnish a pasture in the same year in which the seed is sown. In order to get some information on this very question, a line of experimental work was started in the spring of 1900, with the object of finding out which one of a number of annual crops would give the best results when used for pasture, as soon as possible after the seed was sown. An experiment with fourteen varieties was conducted at the College for a period of five years. In each of the years, the crops were sown in three separate sets, there being fourteen plots in each set; thus making in all a total of forty-two plots each season. All the plots were sown each year on the same day and under similar conditions. The seed was sown in May in each of the five seasons. The three sets were handled in each year as follows:—

Set 1. The crops on all the plots in set 1 were cut at the end of six, nine, twelve, fifteen, and eighteen weeks after the seed was sown; thus making five cuttings for each crop. Each cutting was weighed in the green state, and also after it was dried in the form of hay.

Set 2. Each crop was cut when it was thought to contain the greatest bulk of best quality of green fodder. In order to ascertain the amount of after-growth, another cutting was also made from each crop later in the season.

Set 3. A hurdle fence was placed around a set of fourteen plots and cattle were turned on the plots daily until the pasture was all eaten. The pasturing usually took place in the latter part of June. Careful notes were taken of the amount eaten of each crop daily. After the crops were pastured the first time, they were allowed to remain unpastured until they were again ready for pasturing, when the cattle were turned in and similar notes as on the previous occasion were taken.

The amount of pasture crop produced by the various varieties when grown separately, was according to the following order, starting with the highest and finishing with the lowest yielders: Oats, Common Red Clover, Hairy Vetches, Sugar Cane, Dwarf Essex Rape, Crimson Clover, Rye, Barley, Hungarian Grass, Common Vetches, Corn, Spring Wheat and Soy Beans.

As the different varieties, when grown separately, were ready for pasturing at different seasons of the year and possessed different characteristics of growth, it was thought that better results would likely be obtained from a mixture than from any one crop by itself. In the spring of 1904, therefore, another experiment was started, in order to test the value of these different mixtures of crops which could be sown in the spring to be used as pasture in the same season. Of the six mixtures used up to date, the one which has given the best general satisfaction is as follows:—Siberian Oats, 51 lbs.; Early Amber Sugar Cane, 30 lbs.; and Common Red Clover, 7 lbs. per acre; thus making a total of 88 pounds of seed per acre. The average amount of pasture produced by this mixture has been 10.7 tons per anunm. This crop is usually ready for pasture in six weeks after the seed is sown, although in the spring of 1907, owing to the very cold backward spring, it was about seven weeks before the growth had reached the best condition for pasturing purposes. The crop is relished by the animals. As the oats thrive the best in the early part of the season, the Early Amber Sugar Cane somewhat later, and the Common Red Clover towards the autumn, the pasture holds out very well throughout the entire season. In each of the years in which this experiment has been conducted, there was an excellent coating of clover on the land in the autumn ready to come through the winter and produce a clover crop in the following year. In fact, it is believed that a catch of clover can sometimes be obtained in this way when it would have been difficult to have obtained a good catch if the clover seed had been sown with some cereal which was allowed to grow to maturity.

In 1906, about seven acres and in 1907, about eight acres of this mixture were sown in the Experimental department and pastured with steers until it was necessary to plow the land for the experiments with winter wheat. The land was capable of carrying more than one animal per acre and the steers thrived well, making good gains in each season. The soil on which the steers were pastured was what might be termed an average clay loam. No serious results were observed from the tramping of the animals. It is quite possible that on a heavy clay soil, and especially in a wet season, a crop of this kind could not be grown and pastured with as good satisfaction as has been obtained on the land here described.

CLOVERS AND GRASSES FOR PASTURE PURPOSES.

In the spring of 1906, twenty-one mixtures of grasses and clovers were sown in duplicate with a grain crop. In 1907, the crops produced were exceedingly interesting and were studied by thousands of farmers who visited the College in connection with the June excursions. One of these sets of mixtures was used for the production of hay and the other for the production of pasture. The results show that the greatest amount of pasture was produced by a mixture of Lucerne and Tall Oat Grass, and the highest yields of hay were produced from Lucerne with either Tall Oat or some other variety of grass. We hope to be able to give fuller information on this subject in the near future.

MIXTURES OF GRASSES AND CLOVERS FOR PERMANENT PASTURE.

A large amount of experimental work has been done in testing varieties of grasses and clovers, both singly and in combination within the past thirty years. The grasses and clovers have been carefully studied and much information has been gleaned in regard to their value for hay and also for pasture. In 1885, Prof. Wm. Brown, who was then Farm Superintendent at the Ontario Agricultural College, recommended a mixture which he thought well adapted for a permanent pasture. Only the most hardy varieties which had been tested at that time were included in the mixture. In 1893, after eight years of additional experimental work, during which time the writer was closely connected with the work of the Experimental department, another mixture was recommended, containing a smaller number of varieties and requiring a smaller amount of seed per acre. The grasses and clovers recommended in 1893, have proven themselves to be a valuable mixture. They are all hardy varieties and when grown together give a large amount of pasture. An experiment was started in the spring of 1894 by sowing a plot of the mixture which was recommended in 1885 and a plot of the mixture which was recommended in 1893. During eleven years, no less than twenty-six cuttings were obtained, as from two to three cuttings were furnished each season. The average annual yield of hay per acre produced from the crop recommended in 1893 was 5.1 tons, and from the mixture recommended in 1885, 4.4 tons per acre. The figures presented in this report show the comparative yields of hay from the two mixtures. They also show that the grasses used for this mixture are very suitable for an average soil in Ontario. These mixtures can be used for the production of either hay or pasture, but are more suitable for pasture purposes owing to the unevenness in the maturity of the different varieties, which is a detriment to hay production but an advantage when a crop is used for pasture purposes. We here name all the varieties of grasses and clovers sown in the best mixture and also the quantity of seed per acre, in order to furnish a guide for any person who wishes to know the quantity of seed per acre of the different varieties which are recommended as a permanent pasture mixture for an average Ontario soil. The mixture is as follows: Orchard Grass, 4 lbs.; Meadow Fescue, 4 lbs.; Tall Oat Grass, 3 lbs.; Timothy, 2 lbs.; Meadow Foxtail, 2 lbs.; Lucerne, 5 lbs.; Alsike Clover, 2 lbs.; White or Dutch, 1 lb.; Yellow Trefoil, 1 lb. This makes a seeding of 15 pounds of grass and 9 pounds of clover, or a total of 24 pounds per acre. For average conditions it would probably be as well to omit the Yellow Clover or Trefoil and add another pound of White Clover. On cold wet land the five pounds of Alfalfa might be replaced by four pounds of Red Top. Such a mixture of grasses and clovers can often be used to

Cutting and binding Winter Wheat on the Plots.

Eleven steers pasturing on an eight acre field sown in the early part of May, 1907, with a mixture of 51 lbs. of Oats, 30 lbs. of Early Amber Sugar Cane and 7 lbs. of Red Clover Seed per acre.

A partial view of experimental plots of potatoes, sugar beets and corn.

excellent advantage on fields located on hillsides, or a long distance from buildings, or which are not required for a short rotation, but on which it is desirable to have a permanent pasture which will furnish a large amount of feed of good quality and especially which will furnish a pasture crop in the dry hot time in summer, when the Timothy fields are apt to become greatly parched and almost barren.

A few of the 33,000 farmers who visited the College in the month of June, 1907.

In conclusion, I wish most heartily to thank yourself, and through you, the Minister of Agriculture for the kindly support given me in the work of the department of Field Husbandry during the past year.

Respectfully submitted,

C. A. ZAVITZ.

PART XIV.

THE LECTURER IN FORESTRY.

To the President of the Ontario Agricultural College.

SIR,—I have the honor to present herewith the report of the Forestry department for the year 1907.

The courses of lectures as outlined in the College Calendar have been delivered to the second and fourth year students. The courses could be made of more value if more time could be allowed in the fall term for trips to the woodlots and plantations where practical demonstrations could be made.

COLLEGE WOODLOTS AND PLANTATIONS.

While the greater portion of the department's labor is expended is nursery work, every available opportunity is taken to improve the condition of the college woodlots and plantations.

In the south woodlot, an open space about two acres in extent, has been planted with White Pine (*Pinus strobus*). Experiments in width of planting, autumn planting and mixtures of species, are being tried on this area.

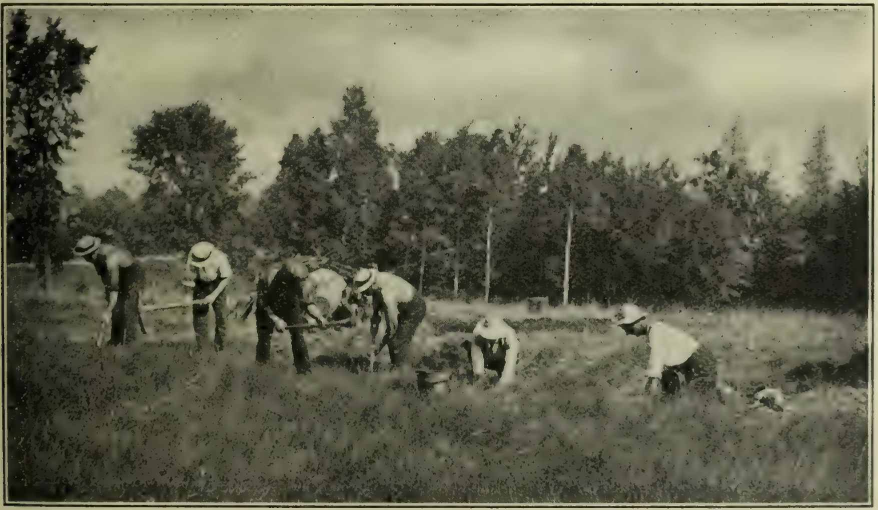

Fig. 1. Planting open area in College woodlot with White Pine.

Scattered planting of White Pine has also been carried on in open places and in the borders of the north woodlot. This woodlot has been cleared of considerable dead material, weeds, etc., which made some parts almost impenetrable.

Owing to the condition of fences for keeping out stock, it has been felt unadvisable to do any planting in the Puslinch woodlot, although it is very open and in need of restocking with young growth.

In some of the early plantations, where too wide planting left the soil so exposed that sod formed, preparations have been made to try experiments in under-planting. In Europe under-planting is done with Beech, Silver Fir and Norway Spruce, and it is desirable to know which of our native trees will best answer this purpose.

In the autumn of 1906 (between 15th of September and 15th of October), Norway Spruce were set out about the borders of the south woodlot and plantations as an experiment in fall planting. Fall planting of evergreens has not been considered as safe as spring planting. The average planter has more time at his disposal about the end of September, and it is hoped that this planting will prove satisfactory. The Spruce set out in the fall of 1906 are doing very well and show that it is quite possible to do such planting. The work has been continued this fall (1907), with White Pine and Norway Spruce.

NURSERIES.

The Holmwood nursery has been chiefly devoted to growing evergreens, as intimated in last year's report.

This season we imported from Germany:

200,000 2 year old White Pine.
50,000 3 “ “ “ “
25,000 3 year old Norway Spruce.
25,000 3 “ “ European Larch.

Of the above shipment the White Pine came over in splendid shape but the Spruce and Larch were badly damaged.

We have at present in the Holmwood Nursery about

100,000 White Pine in seed beds.
175,000 3 year old White Pine.
15,000 4 “ “ “ “
25,000 3 “ “ Scotch Pine.
15,000 3 year old Norway Spruce.
7,000 4 “ “ “ “
5,000 2 “ “ Arbor Vitæ.

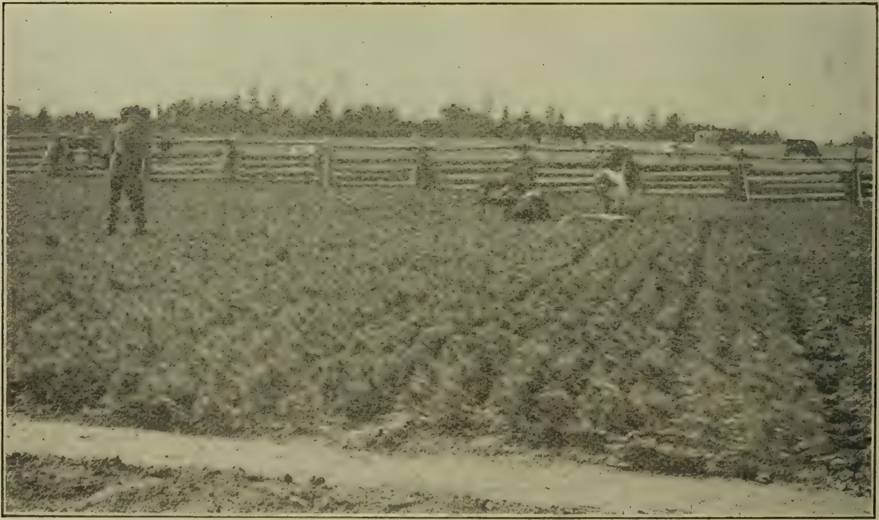

Fig. 2. Three year old White Pine in Holmwood Nursery.

This year fall planting is being tried with 20 lbs. of White Pine seed, and about 25 lbs. of Arbor Vitæ seed. The latter was collected in this district where there was a medium crop of seed, although the seed does not appear to be high in germinating power. Many of the forest tree seeds were this year found to be abortive, which was probably due to the cold, backward spring.

The soil in the nursery is very low in plant food, especially on the side bordering the river where the plants were much weaker. This land being held under lease, it is difficult to make such permanent improvements as are required for proper nursery organization.

Considerable trouble has been found in a disease known as "damping off." One student is making a special study of this disease and it is to be hoped that we may find practical methods of overcoming it.

The greatest damage was done during warm, moist days on locations where the soil was weakest in plant food.

The College Nursery has been devoted to growing hardwoods and ornamental planting materials for the College grounds. There is in this nursery at present the following material:—

Black Locust	25,000	Butternut	3,000
White Ash	15,000	Black Walnut	
Tulip	10,000	Hickory	
Box Elder	12,000	Red Oak	
Hardy Catalpa	10,000	Chestnut	
Black Cherry	3,000		

In this nursery we are trying fall planting of Black Walnut, Burr Oak, Hickory, and Sweet Chestnut. It is difficult to grow Sweet Chestnut, as they are so easily injured by drying out or by moulding from too much moisture. The nuts for planting cost from three to six dollars per bushel, owing to the fact that they are in great demand on the city markets. This tree should be given more attention in southwestern Ontario where it thrives on sandy loam soils. One farmer who had a large number of trees scattered about the farm, received a revenue of $200 in 1906 from the sale of nuts.

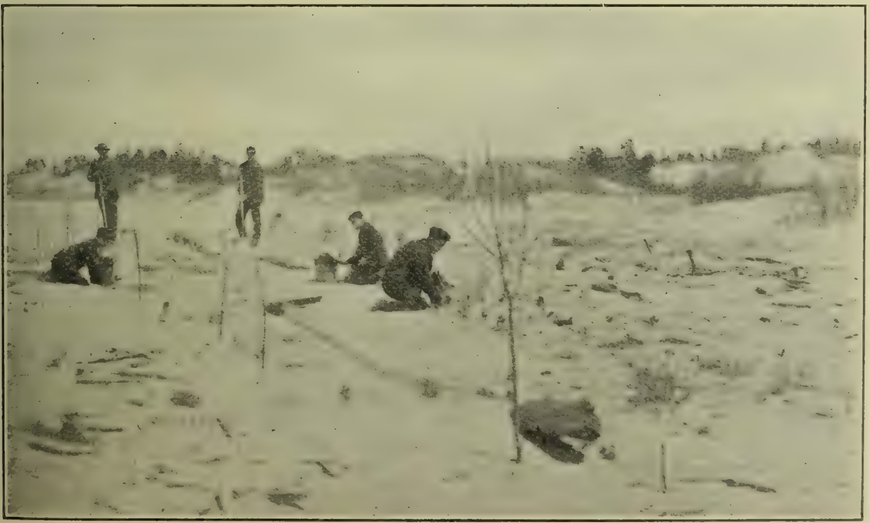

Fig. 3. Planting wash sand land with Scotch and Jack Pine.

It would facilitate the nursery work very much if suitable ground could be found large enough to join the two nurseries. As it is, the two grounds are so widely separated that buildings and other equipment must be more or less duplicated.

Co-Operative Planting.

The last season was particularly adverse to tree planting. Owing to the cold, backward spring the young plants were subjected to strong winds before they could establish themselves. After this followed an exceedingly dry summer, and some failures are to be expected. During the last season about two hundred thousand trees were sent out to applicants throughout the Province. The chief difficulty in this co-operative work will be in visiting the prospective planters' grounds and making planting plans. To carry out this work more assistance will be required. Officers doing this work should be able to give advice to woodlot owners and examine previous plantations in the district.

Some of the earlier plantations were visited and valuable data is being obtained. Planting done on waste sand land in 1905 (cut p. 222 of 1905 College Report), with White Pine and Norway Spruce, was examined. Throughout the White Pine has given better results, but on the worst parts some of the White Pine have been killed. This will be replanted with Scotch Pine and Black Locust, which it is found are better able to thrive on weak blow sand areas. In this plantation the White Pine are thriving wherever any protection is to be found. The first plantation made in Norfolk County was upon steep hillsides of heavy soil. White Pine was the chief tree used and about 95 per cent. of the trees are alive and doing well. This last season they averaged about eight inches of growth and are now above the grass and weeds.

One of the most promising trees for waste, sand types of soil is the Black Locust. It seems to withstand adverse conditions and should be of special interest to farmers with waste land propositions. Very extensive work has been done in Hungary with this tree, where it is estimated that they have about 200,000 acres of pure Locust forest in the form of plantations. The Agricultural Department encourages tree planting and sends out every year from five to six million Locust seedlings. This planting is done on soils which are absolutely worthless for agriculture, and the following tables* give results from some of the earlier plantations:—

Stand of Seeding Locust on Sample Plots of One Acre.

Plot.	Soil Quality.	Age.	Number of Trees.	Average diameter breasthigh.	Average height.
		Years.		Inches.	Feet.
a	Good	30	558	5.3	63
b	Best	31	512	7.5	60
c	Fair	30	594	4.3	38
d	Poor	30	288	3.0	20

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*From Forestry Quarterly.

STAND OF SECOND-GROWTH LOCUST ON SAMPLE PLOTS OF ONE ACRE.

Plot.	Soil Quality.	Age.	Number of Trees.	Average diameter breasthigh	Average height.
		Years.		Inches.	Feet.
e	Fair	8	452	3.3	30
f	Good	15	643	4.3	47
g	Fair	I5	391	3.7	33
h	Poor	15	324	2.3	20

These figures are for a district where the annual rainfall averages 21 inches and the temperature ranges from zero in winter to 95 degrees F. in summer. This district is very similar to southern Ontario, and the figures are of more value to us than any results obtained in the middle western states where planting has been done on good soils.

The first table where plots are of seedling origin, are 30 years old and would average 488 trees 5 inches in diameter and 45 feet high, estimating two fence posts to the tree we would have 976 posts at 20c a post, which would give a revenue of $195.20 or an annual, gross revenue of about $6.50, and this on non-agricultural soil.

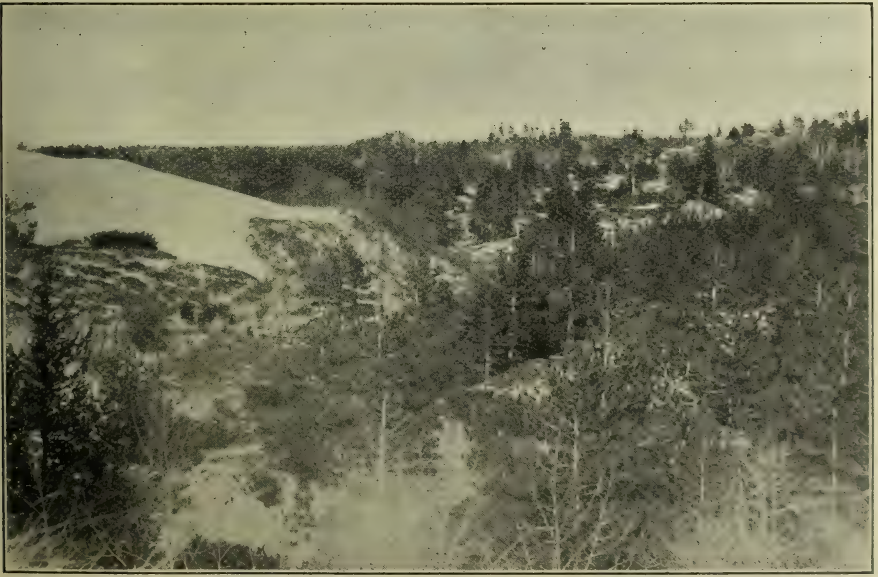


Fig. 4. Blow sand forming dunes and destroying young Forest growth.

The second table which represents second-growth or coppice (meaning the sprout growth coming up from the stump after cutting), shows better results than the seedling plots.

The fact that this growth can be had on poor soil in from 15 to 30 years, makes this tree of value to the farmer. Black Locust at this age is chiefly of use for posts, vine stakes, poles, fuel and general farm work.

Waste Lands.

During the summer I have visited and roughly surveyed the large tracts of waste land in the southwestern part of Ontario, concerning which I am preparing a special report. There is in this old, agricultural portion of the Province, in the neighborhood of two hundred square miles of waste land. This so called waste land, in areas varying in size from 3,000 acres to 60 square miles, is sand formation and will not stand tilling and cropping. It originally produced splendid pine and should be devoted to forest purposes.

By segregating and reforesting these lands we would protect adjoining agricultural land from sand blows, assist in insuring a future wood supply, protect the sources of small streams and give employment to local people.

Respectfully submitted,

E. J. ZAVITZ.

PART XV.

THE MANAGER OF THE POULTRY DEPARTMENT.

To the President of the Ontario Agricultural College:

Sir,—I have the honor to submit herewith the report of the Poultry Department for the year 1907.

Teaching, as heretofore, includes the work with the regular College students, the short course students, the Farmers' Institutes, and the poultry shows. This part of the work scarcely needs a detailed report.

Much of our time, this year has been given to experiments in the hatching and the rearing of chickens. We have, in previous years, studied these problems, but this year we devoted nearly all our time to these very important and perplexing questions. A detailed report of the work done by this department, also that done by the Departments of Physics, Chemistry, and Bacteriology, has been printed in bulletin form. It is, therefore, unnecessary for me, at this time to report upon these experiments.

Poultry Houses.

In last year's report a general description was given of a long poultry house that had been constructed, for the purposes of testing hens as layers and as breeders in flocks of 50, 75, and 100. It is not wise for one to draw conclusions from one season's tests on a question such as this, and I shall, therefore, not go into the detailed results, but shall give a general summary of the results.

The egg production during the winter was best in the small pen of 50 birds, but for the balance of the season there was practically no difference in the egg yield. I do not consider the winter results very important, for the reason that we had some trouble with the health of birds in the larger flocks. We were short of a few females to make up the required number and purchased the same. The purchased birds appeared healthy when they arrived, and remained so for nearly three weeks, when some of them, placed in the two larger pens, developed chicken pox. This disease almost stopped egg production. The birds that developed very bad cases were killed and burned, but nearly all were successfully treated by burning the sores with caustic. We used Epsom salts freely, and plenty of lime was also used on the dropping boards. The eggs hatched well from all the pens, and if there was any difference it was in favor of the large pen. The fertility of the eggs was better from these flocks than any others on the entire plant.

The birds in this house were fed whole wheat in deep straw or litter early every morning, winter and summer. For part of the year the wheat was scattered in the litter after dark at night, so that very early in the morning the hens could go to work. We found this plan useful to us when we had more work to do, during daylight, than we could possibly get done.

Beef scrap and a dry mash composed of bran, shorts, oatmeal, and cornmeal of equal parts by measure were kept in hoppers constantly in front of the fowls. During the winter, roots or other green food was given at noon and some alfalfa meal was mixed in the mash. We feed nothing at noon or night during the summer, depending entirely upon the hens eating what they wanted from the hoppers. The results were quite satisfactory, but during the winter and in October when the poor layers were replaced by pullets, we found it necessary to feed corn at night, as much as the birds would eat. Unless we feed our pullets plenty, they do not develop and lay when changed from free range to winter quarters. Our experience is that a hen must be in good condition as to flesh before she lays; we realize that some get too fat, but more get too little food.

The reports of 1905 and 1906 contained results of the experiments with four styles of poultry houses. These reports indicated that a warm, stuffy house was not as good for egg production, and further, the birds were not as healthy as in a house much colder, but better ventilated. The results of this year as to laying, hatching, etc., are the same as in previous years. The poultry house costing the most to build gave the poorest results.

TRAP NESTS.

The only way to know which hens are paying it to know which hens are laying. The trap-nest tells us this, but it takes time to release the hens and record the eggs. We have been able to keep the egg record of nearly 500 hens. For our incubator experiments it was necessary to have the eggs in each machine, laid by the same individual, so as to get uniform results, There can be no doubt that it pays us well to keep such records. The public buy a number of birds for breeding purposes, and many want males from our best layers. I believe it would pay the average farmer to know what hens lay during the winter months. Our records show that most winter layers make the best yearly records, and these are the birds to breed from. Their eggs may not hatch as many chickens, but they are worth more. We commence our year at December the first, and cull out the poor layers about the first of October. Where as low a standard as one hundred eggs is used fully fifty per cent. of the hens are culls. Many of the yearling hens have laid well. We have a few hens four and five years old that are still doing fairly well. Many of the hens that laid well during the winter months of 1905 and 1906 did as well in 1906 and 1907, or it would appear, so far as we have gone, that a pullet which lays well during her first winter is a likely winter layer for the next year, at least. We were rather surprised, when culling the flock in October, to find, that more of our poor layers had moulted better or earlier than the good layers. This applied as much to yearlings as to the pullets. The greatest layer of the flock was a yearling hen. She laid 210 eggs from Nov. 9th, 1906, to Nov. 1st, 1907. Most of the good laying hens moulted quickly, and several laid a few eggs while in heavy moult. We cannot as yet state that the eggs from heavy layers are poor for hatching purposes. We have started some very interesting experiments with individuals as to the number of eggs that hatch, and the general growth and development of the stock as well as egg production.

GROWING CHICKENS.

Our experience is that in order to grow the best chickens at the least cost, and as quickly as possible, one must be careful to put them on new or untainted ground. We find year after year that where we raise chickens on new ground, they grow faster and make larger birds. We have ground upon which chickens have been grown for nine or more years, and this season we placed chickens on this ground April 1st, and placed another flock of the same breeding on new ground, April 23rd. By October the chickens on the new ground were fully as well matured and were larger in size. The feeding was the same to both flocks. Most farm chickens have sufficient range so that this may not be a very serious matter, but to those who are growing many chickens, a rotation of crops is very desirable. We have grown good chickens in the cornfield and in the orchards. The more the land is cultivated or stirred, the better the chickens grow.

The importance of feeding little chicks green food in abundance is impressed upon us year by year. We now make a special effort to supply all the lettuce, rape, or other tender green food a chick will eat from the day it is hatched until it is at least, four to six weeks old, at which age they can run about and hunt for themselves. We do not put two broods of chicks on the same ground during one season, and further, June, and even July chicks will do very well when the green food is well supplied and the range is new. A little chick cannot get much green food from old tough grass.

We have, this year, fed the chickens from hoppers after they were four or five weeks old. A few chickens were so fed from the day they were hatched. This worked fairly well when the weather was fine and the range was large. The hoppers contained wheat and cracked corn, and for part of the chickens a hopper of mash, composed of bran, shorts, and cornmeal of equal parts, to which was added ten per cent. of beef scrap was supplied.

Fattening Chickens.

Owing to the high price of feeds, we made some changes in our ration for fattening the chickens. The cheapest, palatable ration we could find, locally, was one composed of equal parts of ground corn, low grade flour, and middlings. This mixture cost $1.30 per hundred pounds. The gains made by the birds were not equal to those made in previous seasons when oats and buckwheat were fed along with the corn, nor yet was the quality of flesh as good. The birds did not dress as white as we usually have them. Sour skim-milk or buttermilk was used for wetting the ground grains.

Many of the dealers of dressed poultry complain of the thin chickens that are sent to market, and I have noticed that on many of the local markets the birds offered for sale were anything but fleshy and the method of dressing was very bad. Scalded, thin chickens where the skin is mostly torn off are certainly unsightly and further, they decompose more quickly than those which are dry plucked. All birds offered for sale, where they have to be kept a few days, should be dry plucked.

It may be of interest to know what it costs to fatten chickens, and what the difference is between the cost price and the selling price. The following table gives the results in fattening 60 chickens hatched between June 15th and July 1st. The birds were reared in a corn-field and were put in the fattening crates October 1st. These were the cull birds, those that we did not want to use in our laying or breeding pens. We are keeping a number of June chickens as egg producers for 1908. There were 12 chickens of each of the following breeds: Barred Plymouth Rocks, White Plymouth Rocks, White Wyandottes, Buff Orpingtons and Rhode Island Reds. These chickens would have been worth not more than eight cents per pound live weight when taken from the corn field. They were sold when fattened for twelve to fourteen cents per pound.

Weight when put in the crate, 181.5 lbs.
Weight after three weeks feeding, 252 lbs.
Grain consumed, 249.25 lbs.
Milk consumed, 517 lbs.
Cost of feed, $4.26.
Chickens cost at 8c. lb. live weight, $14.52.
Total cost, $18.78.
Dressed weight, 212.5.
Selling price at 12c. per pound, $25.50.
Profit, $6.72.

The profit on each chicken does not appear very large, yet at the same time, one must consider that there is a gain of $6.72 for the work, or we consider an amount over 50 cents per hour. This is not an unusual lot of chickens. Many chickens have made greater gains than were made in this trial. There is nothing in the trial, so far as I know, but what can be accomplished by anybody.

To market thin chickens is wasteful and it appears to me there is at least sufficient margin of profit to pay a reasonable wage.

We need a proper building for incubators. We now have no room large enough to hold the machines for the short course students, nor yet large enough for the experimental work.

Much of the work accomplished this year could not have been done without the faithful services of John R. Terry. The assistance of J. L. Woods and W. A. Brown during the summer months was very satisfactory.

I am also deeply indebted to the various departments of the College, who have assisted me in many ways.

Respectfully submitted,

W. R. GRAHAM.

PART XVI.

THE LECTURER IN ECONOMICS.

To the President of the Ontario Agricultural College:

Sir,—I have the honor to submit the following report:

My duties began with the opening of the department of Economics on September 15th. Previous to this time no instruction had been given at this College in Agricultural Economics, and, with the exception of about twenty-five lectures on the principles of Political Economy given the second year, no Economics of any kind had been taught. Consequently *any* perceptible progress would be *great* progress, and it is only what might be expected if the work being done at the present time is largely of a missionary nature.

Since the opening of the fall term two periods per week have been taken with Second Year and one with Third Year.

In the course of the Second Year it is the aim to cover as fully as possible the outline given below, with a view towards giving the student such a grounding in the principles of Political Economy as will enable him in his Third Year to take up and discuss in an intelligent manner economic questions which have a direct bearing upon agriculture. The following is a synopsis of the work attempted:—

1. *General Notions.*
   The object of Political Economy.
   The wants of man.
   A discussion of wealth, value, price.

2. *Production.*
   Factors of production—the part played by nature, labor and capital.
   Methods of Production—Crises, overproduction, competition.
   Division of labor—conditions, advantages and disadvantages.

3. *Exchange.*
   Exchange value.
   The utility theory.
   The cost theory.
   Advantages of exchange.

4. *Principles of Money.*
   A short history of money.
   Fluctuations in money and disturbances caused thereby.
   The conditions which should be fulfilled by all good money.

5. *International Trade.*
   Advantages.
   Doctrine of Protection.
   Doctrine of Free Trade.
   Relative importance of Foreign and Domestic Commerce.

6. *Distribution.*
   How the Distribution of Wealth is effected.
   Wages, Trades Unions, Strikes, Interest, Laws of Interest, Rates of Interest, Profits.

7. *Saving.*
    Conditions necessary.
    Institutions to facilitate Saving.
    The social utility of Saving.
    Investment.

The course outlined for Third Year is as follows:

1. *Agricultural Education.*
    Effect of Education on Agriculture.
    Importance of so modifying and balancing Public and High School curricula that the brightest boys may not be drawn from the farm.

2. *Features of the Agricultural Industry.*
    Dependence upon nature.
    Laws of Capital and Labor as applied to Agriculture.
    Laws of Rent.
    Relation to other industries—Agriculture a trade, a business, a profession.
    Contrast between the management of Agriculture operations and those of the manufacturing industry.
    Comparison of Canadian Agriculture with the Agriculture of United States and Great Britain.
    Development of Commercial Agriculture.
    Law of Diminishing Returns.
    Effect of crop failures, immediate, prolonged, direct, and indirect.
    The World's food supply.
    Agricultural Resources of Canada.

3. *Markets.*
    Local, Domestic, Foreign.
    The Farmer and his competitors.
    The Farmer and his creditors.
    Banks and Middlemen.
    Boards of Trade.
    Prices and movements of prices of Agricultural products.
    Transportation of Agricultural products—wagon, railroad, trolley line, canal, ocean.
    Rates and discriminations.
    Increase of consumption of products—the factors of choicer, more uniform, and better distribution of products.

4. *The Farmer and Co-operation.*
    History, rules, essentials, dangers, gains, altruism, and organization of Co-operative Corporations.

5. *The Farmers Relation to the General Problems of the Day.*
    The tariff, the single tax, food laws, government aid, farm labor, problem, use of machinery, Tenant Farming, Specialty *vs.* Diversified Farming.
    Large *vs.* Small Farming.
    Business methods.
    Immigration and Migration.

It seems altogether unlikely that the course thus outlined for Third Year can be covered in one lecture per week; therefore I would strongly recommend continuing the work through Fourth Year.

Respectfully submitted,

H. H. LeDREW.

PART XVII.

THE DIRECTOR OF HOME ECONOMICS.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit herewith the fourth annual report of the work of the Home Economics department for 1907.

THE YEAR'S WORK.

As last year, the Home Economics department has been almost wholly occupied during this year with the instruction of students. The tradition of the College was maintained by eighty-eight per cent. of the students belonging to the non-professional class, who went back to their own homes to put into practice there, we hope, the lessons learned in Macdonald Institute. A strong class of Domestic Science teachers graduated from the normal course, and a good but small class from the housekeeper course. All of the housekeepers and the majority of the teachers are already at work in various situations between New Brunswick and Vancouver. A new course devoted chiefly to sewing and allied subjects was opened in September. The present class is small, but their work is proving attractive, and already several applications are filed for admission to the spring course. No great changes have been made in the other courses, but we believe those made have strengthened them.

THE DIFFERENT COURSES.

1. THE NORMAL COURSE.

Ten entered the two-year course in September, 1905. They formed an exceptionally strong and even class; all passed into the senior class in September, 1906; all passed the final examinations in June, 1907, and have received the Macdonald Institute Teacher's Certificate in Domestic Science. Nine entered the course in 1906; four passed on to the senior class in September, 1907, and are now in attendance. Fourteen students entered the course last September.

Eight experienced teachers entered the one-year course in September, 1906; all passed the final examinations in June, 1907, and have received the Macdonald Institute Teacher's Certificate in Domestic Science. Seven teachers entered this class last September. Last year we were obliged to refuse quite a number of applications; this year, when owing to the smaller number of two-year seniors, more could have been accepted, there were few applications. This is doubtless due to the general scarcity of teachers.

The Guelph public and high schools continue to send us classes for practice-teaching, but the number is cut down to four, because the class requiring practice is smaller than usual.

The courses as being carried out are fully outlined in the Calendar, and are about the same as last year, except that more time is given to biology and English has been made a required subject of the two-year course. The junior class takes first year University English, and the senior class second year University English with Professor Reynolds. The students are thus able to write on university examinations in English. The subject was elective last year, but was made compulsory first for its value to the individual student, and second in order that graduates may take higher standing should they at some future time seek credit in other schools for the work done here.

An interesting part of the normal course is the experimental work carried out by senior students. It is planned in order that these students may have some training in such work in order that when faced with the housekeeper's frequent question, "Which is the best way?" they may be equal to the business of finding out if they do not know by accurate experience. Each student is given one problem to work upon; they are required to make careful plans, their work is supervised, and they must hand in a detailed report of the whole. Great care and accurate work is necessary to make these experiments of value to any but the student. Many of the reports make very interesting reading, and three such reports are given to show something of the nature of the work. They may be considered contributions to the solution of the problems stated.

I. REPORT OF EXPERIMENT IN COOKING BEANS.

Lot.	Weight after Soaking.	Total Solids lost in Soaking.	Appearance of Cooked Beans.	Tenderness of Cooked Beans.	Palatability of Cooked Beans.	Weight of Cooked Beans.	Proteids lost in Cooking.
	Ozs.	Grams.				ozs.	grams.
I.......	12¼	1.924	Skin yellowish, rest of bean slightly yellow. Skin somewhat broken. Swollen about half as large again.	Skin leathery. Inside still quite firm.	Taste bitter and uncooked. Were not at all mealy.	15¾	3.85
II......	12½	2.009	Skin slightly yellowish and more broken than in I. Size same as I.	Skin tough enough to be removed by rubbing. Inside quite hard.	Taste bitter and uncooked. Were no more mealy than in I.	16	3.815
III.	12¾	1.799	Skin slightly yellow, burst in many places and looked thinner. Inside looked mealy. Size same as I.	Skin more tender than I. and II. Inside very tender and mealy.	Flavor sweet and agreeable. Inside being mealy was easily broken up in mouth.	16½	3.64
IV......	12¾	2.492	Beans white throughout, skins quite tender, transparent. Inside reduced almost to pulp.	Skin and inside both tender, but mushy rather than mealy.	Flavor flat, had no real flavor at all. Tasted mushy, all mealiness was destroyed.	17	5.439

A. *Problem.* To determine the most satisfactory method of boiling beans.

B. *Method.* Cook each lot for the same length of time.

(1) In water and lime, .03 per cent. lime.
(2) Guelph hard water.
(3) Guelph hard water softened by boiling.
(4) Guelph hard water softened by bicarbonate of soda; proportion 1 teasp. per gallon.

C. *General description of experiment.*

Four half-pound lots of small white beans were weighed out and placed each in a separate bowl.

Over 1 was poured 1 qt. of the lime water.
" 2 " " " Guelph hard water.
" 3 " " " " " " softened by boiling.
" 4 " " " " " " " addition of ¼ teasp. of bicarbonate of soda.

Each was allowed to soak 12 hours. Then the water not soaked up by the beans was poured off, put into separate vessels and sent away for analysis by chemists. Then each lot was put into the upper part of double boilers, with cold water of the same kind and amount in which it had soaked. The upper parts of the double boilers were then placed into the lower parts, which were partially filled with boiling water. The four boilers were placed on lighted gas stoves. The beans were allowed to simmer thus for three hours. At the end of this time each lot of beans was drained from the water in which it had cooked. Each quantity of water was put into a separate bottle and was sent to the chemical laboratory for analysis.

N.B.—Throughout the experiment every care was taken to have all conditions equal.

Conclusions.

1. Beans soaked in softened water increase most in weight by taking up most water.

2. Three hours' cooking at simmering point will not soften and disintegrate the cellulose of beans soaked and cooked in hard water.

3. Beans cooked thus are neither palatable nor digestible.

4. The harder the water in which beans cooked, the same length of time, the more unpalatable and indigestible the beans, and the more proteid lost in cooking.

5. Beans cooked in water softened by boiling have a much more appetizing appearance than those cooked in water softened by baking soda. They keep their shape better and are only very slightly colored yellow.

6. Beans cooked in water softened by boiling are the most mealy. They would therefore be most digestible, as the saliva could most easily mix with the particles of the bean.

7. Beans cooked in water softened by boiling are the most palatable.

8. Beans cooked in water softened by boiling are the most nutritious. They lose least of their nutritive constituents in soaking and cooking.

9. As seen in this experiment, the best results are obtained by cooking beans in water softened by boiling.

N.B.—In all cases the skins were somewhat tough and therefore indigestible.

Statement of cost of experiment—2 lbs. white beans at 5 cents per pound, 10 cents.

Experiment carried out—May 26th and 27th, 1905, Macdonald Institute, Guelph, Ontario.

II. Report of Experiment in Vegetable Cooking.

A. *Problem.* To determine the most satisfactory way of cooking strong smelling vegetables.

1. Consider time required.
2. “ smell through house.
3. “ color of vegetable when served.
4. “ flavor “ “ “
5. “ tenderness “ “ “
6. “ nutritious substance dissolved out.

B. *Vegetables cooked.* Onions, cabbage.

C. *Methods of Cooking.*

1. Boil hard in uncovered pot in salted water.
2. “ “ “ “ “ unsalted water.
3. Simmer in close covered pot in salted water.
4. “ “ “ “ unsalted water.

D. *Order of procedure.* Considering all but point 2.

1. Plenty of boiling water was on hand.

2. One-half pound of onions were put into each of four stewpans. To the first and third one teaspoon of salt was added.

3. This was repeated with cabbage.

4. Stove plates were put on the gas burners for the third and fourth pan of each vegetable.

5. One pint of boiling water was added to each pan.

6. The third and fourth pan of each vegetable was covered, the gas lit and all cooked until done, the third and fourth of each being watched carefully and altogether one pint of boiling water added to 1 and 2 of each as it boiled down.

7. The time required for each was noted. When cooked they were drained through sieves into eight bowls, letting them stand until thoroughly drained.

8. While straining, the *color* of each, as in A. 3, was noted and compared.

9. Each was seasoned with salt to render it palatable, and the flavor compared as in A. 4.

10. Each was cut with a fork, tasted and compared for tenderness as in A. 5.

11. The liquid was bottled, labelled, and taken to the chemical laboratory for analysis, to compare the amount of nutritious substances dissolved out.

E. *Testing point 2 of onions.*

1. In each of two kitchens plenty of boiling water was on hand.

2. One-half pound of onions was put into each of two stewpans with one teaspoon of salt, according to conclusions of above experiments.

3. One pan was put on to cook in one room with one pint boiling water and boiled in uncovered pot until cooked.

4. The amount of smell through the house was noted.

5. The other pan was taken to another room, one pint boiling water added, and put on a gas burner over a stove plate, and simmered closely covered until done. The two pans were watched carefully to see that the odor of one did not reach the other, by keeping doors closed.

6. The smell of the latter was noted and compared with that by boiling.

F. *Result of Experiment on Onions.*

Method.	Time.	Smell through house.	Color when served.	Flavor.	Tenderness.	Nutritious substance dissolved out.
	mins.					grams.
1.	40	Odor in room next, and decided smell in the kitchen.	Yellowish white and watery.	Better flavor than in method 2. Not as good as in method 3.	No difference could be detected when each was cooked until done.	14.037
2.	40	"	"	Not as good as in methods 1, 3 or 4.	"	9.712
3.	80	A very slight odor in room next, and a slight odor in the kitchen.	Greenish white and nicer looking.	Better flavor than 1, 2 or 4.	"	13.695
4.	80	"	"	Better flavor than in method 2. Not as good as 1 or 3.	"	8.349

NOTE.—One teaspoonful of salt equals 5 grams. Just what proportion of this appeared in the liquid cannot be stated.

G. *Result of Experiment on Cabbage.*

Method.	Time.	Smell through house.	Color when served.	Flavor.	Tenderness.	Nutritious substance dissolved out.
	mins.					grams.
1.	50	Decided odor in the room and also just as you approach it.	Yellowish white and watery.	Better flavor than in method 2. Not as good as in method 3.	No difference could be detected when each was cooked until done.	10.148
2.	50	"	"	Not as good as in methods 1, 3 or 4.	"	6.9125
3.	60	Faint odor in the room none until you get right in.	Greenish white and nicer looking.	Better flavor than in 1, 2 or 4.	"	10.313
4.	60	"	"	Better flavor than in method 2. Not as good as in 1 or 2.	"	6.988

(*f*) *Summary.*

1. When simmering there is less steam escaping, and what little there is is not allowed to escape owing to the closely fitting cover. There is therefore much less odor escaping during the cooking.

2. The vegetables have a much better color simmered with a lid on.

3. The flavor is much better when the vegetable is cooked with salt. It is less insipid and more even than could be got by adding salt afterwards.

4. A longer time is taken to simmer.

5. More substance is dissolved out in using salt.

We do not depend on cabbage or onions to give us food substance, so the little lost is not of much importance.

The time taken to cook is usually a minor part, therefore points 4 and 5 are overbalanced by points 1, 2, and 3.

G. *Conclusion.*

The best method of cooking strong smelling vegetables is to simmer in a covered pot in salted water.

H. *Cost of the experiment.*

4 lbs. onions	20c.
4 lbs. cabbage	38c.
16 teaspoons salt	00.2c.
Total cost	58.2c.

III. REPORT OF EXPERIMENT IN MIXING FAT INTO DOUGH TWO DIFFERENT WAYS.

A. *Problem.* To determine the comparative result of adding shortening to a dough by rubbing or cutting it into the flour or by melting it and adding it.

1. In baking powder biscuits.
2. In cookie mixture (also by creaming shortening).

B. *Baking powder biscuit.*

1. *Ingredients.*

1 cup flour.
$\frac{1}{4}$ teasp. salt.
$1\frac{1}{2}$ teasp. baking powder (Cleveland's).
1 tablesp. shortening (half butter and half lard).
$\frac{1}{3}$ cup sweet milk (about).

2. *Method.*

a. By rubbing shortening in. Sift dry ingredients together—flour, baking powder, and salt. Then shortening was added (rubbed int odry ingredients), then mixed as quickly as possible into a soft dough with milk.

b. By melting shortening. Dry ingredients were sifted together, using exactly the same proportions as in the first method, but instead of rubbing the shortening in, it was melted and mixed in flour, then the same amount of milk was added.

Both mixtures were handled as little as possible and baked in a hot oven 490° F. In both cases eight biscuits were made. The same conditions exactly were given in both cases, the only difference being the method in which shortening was added.

3. *Result.* Both were equally as well risen and from outward appearance looked equally as well, but on breaking the one with melted butter was of inferior texture and seemed very tough, while the one the butter was rubbed in, texture was much better, more spongy, and quite tender as compared to biscuits made by the other method (melted butter).

C. *Cookies.* Mixture made by adding shortening in three different ways:

a. By creaming butter.
b. By rubbing butter in flour.
c. By adding melted butter.

1. *Ingredients.*

1 cup flour.
⅓ cup butter.
½ cup sugar.
1 small egg.
⅔ teasp. cream tartar.
⅓ teasp. baking soda.
Two-ninths teasp. ginger.
⅙ of nutmeg.
1 teasp. hot water.

2. *Method.*

a. Butter was creamed and sugar added gradually, then egg added unbeaten and soda dissolved in hot water; lastly, flour, cream of tartar and spices sifted together. This mixture was allowed to stand 1 hr. in refrigerator.

b. Flour, cream of tartar and spices sifted together, then butter was rubbed in, then egg dropped in unbeaten, soda dissolved, and all mixed to a dough. This mixture was also allowed to stand for 1 hr. in refrigerator.

c. Flour, cream of tartar and spice was sifted together, then sugar added and then the melted butter, lastly the egg and dissolved soda.

Note.—Three teasp. of flour (extra) was added; part of this was used when rolling out the cookies.

The three mixtures had exactly the same conditions—were allowed to stand the same length of time, baked at same temperature. The only difference being the method the ingredients were combined. Rolled the same thickness and cut with the same cutter.

3. *Result.*

a. Made by creaming the butter had slightly better appearance, a little more crisp, and seemed to spread out a little in cooking.

b. and *c.* No noticeable difference in either appearance, crispness or flavor. Could not tell *b.* from *c.* if they had not been labelled. Both *b.* and *c.* seemed to rise more than *a.*, which flattened out a little.

The three mixtures were baked at a temperature of 320° F.

Note.—After the mixtures had stood for several hours the little difference that appeared at first seemed to disappear and it was impossible to tell one mixture from another when baked, one being equally as good as the other. *b.* and *c.* had a slightly spotted appearance owing to the sugar not being as well dissolved; this disappeared on standing.

2. The Housekeeper Course.

Five students entered this course in September, 1905; four passed to the senior class and two entered (by virtue of Normal and Homemaker course work) in September, 1906; four passed the final examinations in June, 1907, and have received the Macdonald Institute Housekeeper certificate. These four, after graduation in June, remained in Macdonald Hall all through July, in order to get extra experience by acting as assistants to Miss Tennant while the Summer School was in session. The experience proved so valuable that we hope it may become a permanent feature of the course. Four entered the course in September, 1906; three passed into the senior class last September, and four are now in attendance. Three entered upon the course last September.

Three graduates are entitled to receive the Professional Housekeeper certificate because of having successfully completed six months' work as an institution housekeeper.

This course is a professional one offered to mature women who have had a good deal of housekeeping experience at home and desire training to fit themselves for housekeepers or dietitians in larger institutions. They are expected to have good executive ability before entering and the course aims to give them correct standards in the preparation of food, housework, sanitation, etc., and to train their executive ability along the lines of institution requirements. They are required to take the same science and practical work as the Normal students, but instead of studying school equipments and methods of teaching, they study methods of administration for large buildings such as our own residences for men and women. Each is in turn required to act as marketwoman, loan clerk, and classroom housekeeper, doing the clerical work of each office. With Miss Tennant's assistance and instruction they investigate the working of Macdonald Hall. Part of this investigation consists of becoming a dining-room maid, a house-maid, and a kitchen-maid for a short time in order to gain accurate and intimate knowledge of the duties and difficulties of each position.

The opening of this course has been fully justified by the results. All the graduates have readily found employment, and several have been at work long enough to demonstrate their success. We could have placed half a dozen more in the last two months. The demand for them is increasing rapidly, but we have no hope of meeting the demand, as our present class is small. This is a pity, because the salaries offered are as good, and in many cases better than those of the average domestic science teacher. There are many capable women in the Province to whom this work should be attractive when they realize its possibilities. Two years of time, and three hundred and sixty dollars in money, seems a good deal to spend after a woman has reached mature years, but a comfortable income and a good home is worth the time and the money.

3. The Homemaker Course.

This is the non-professional course planned for the girls who have had little experience of household affairs. The required work is about the same as last year's, with the addition of an interesting course in color-harmony with Mr. Evans. This has not been fully worked out, but the results justify its beginning and demand its extension. It is an effort to lead the girls to apply the laws of color and form to clothing and home decoration. It began with a study of the primary, secondary, and tertiary colors with a water color box as a basis, for standards in their combination later. Thence they passed to a brief study of color-balance, which is the proper proportion of different colors in one combination. They took up a little elementary work in design, and immediately worked out simple designs suitable for cushions, curtains, etc. Some of these were carried out in cloth and color. Following this they carried out practical demonstrations of color combinations in dress, using actual cloth, hats, etc., and finally carried out some practice in combining wall papers, furniture, etc. A small room was given over to their use and the girls worked in sections. Each group worked out a different color combination and decorated one corner, which was criticised and discussed before the next group had its turn. We have been trying to develop work along this line since the Institute's opening year, but this attempt is the first that has proved at all satisfactory. This kind of work, like other practical work, takes a great deal of time, but we believe it to be of great value to the girls.

Every student is required to take the prescribed subjects. If she gives evidence that she has accomplished the work of any subject elsewhere, she is given credit for it and permitted to elect other subjects to occupy the time. This proves of great advantage to the girl who has been taught elementary sewing at home, since she is then able to begin in a higher class and accomplish a good deal of advanced sewing in the year. The practical housework and practice-housekeeping are very satisfactory features of this course, giving most valuable training to the inexperienced girl who works earnestly.

Twenty-three entered this class in September, 1906, ten passed the final examinations last June, and have received the Macdonald Institute Homemaker diploma. Twenty-eight entered last September and are now in attendance.

There is no dearth of applicants for admission to this course. It is one of the most popular with parents, but it will be noticed that the number who complete the course is small. This is probably due in part to the lack of incentive in a non-professional diploma, in part to the fact that the course is comparatively new and our girls have not yet learned to look upon the possession of the Homemaker diploma with the same sort of pride the College graduate looks upon her degree; and in part to the fact that many girls do not realize before entrance that the course calls for a great deal of hard, earnest mental work as well as plenty of practical work.

It is gratifying to note that three members of the present class propose continuing two years. They are taking practical and science work with the professional classes, and will take additional English and electives to broaden their course. This may prove the beginning of a course which may develop into an O.A.C. associate course.

4. The Short Course in Domestic Science.

This course, which consists of a good deal of practical work in cookery, laundry and sewing, a few lectures each on home nursing, food and sanitation, an elective subject and a little practical housework, is as popular as ever. There are no examinations and no diploma for incentive, but we find the average student works hard to get as much as possible into the three months' time. The course as outlined last year proved so satisfactory that no change was made in it this year.

There were in attendance this year:

Winter term, January to March	40
Spring term, April to June	26
Autumn term, September to December	29
Total	95

5. The Short Course in Sewing.

This is the new course offered to meet the demand for a three months' course devoted to sewing and allied subjects, in much the same way as the other short course is devoted to domestic science. It was opened in September with four old and one new students. The class is small, but their work is attracting a good deal of attention. Eight applications for the Spring course have been accepted already and we are likely to have a full class when it opens. The course is in no sense professional. Its object is to do all that can be done in three months to help the girl who is anxious to learn to do the simple dressmaking required in the average home.

Each candidate for entrance must be possessed of good eyesight and give satisfactory evidence of her ability to make a plain cotton shirtwaist. There is no examination and no certificate for this course. There are four lessons weekly in dressmaking, two in millinery, two in embroidery, two in color work like that of the Homemaker course, one in laundry, one in the study of textiles and one elective. The practical lessons demand a good deal of work outside of classes and keep the girls pretty busy, but they are accomplishing a good deal.

6. Optional Courses.

These courses are made up of subjects chosen from the regular courses and list of optional subjects.

The number of optional students this year was small because most of the classes were filled with students of regular courses, and the teachers' time so fully occupied with them that it was not possible to open more than one extra class. The majority were Guelph girls taking one or two subjects.

During the year there have been five six-month students, thirteen three-month students and eleven who came for a course of twelve cookery lessons. The last eleven were office girls from Guelph, who formed the evening class.

Student Workers.

The arrangement continues with the housekeeper of Macdonald Hall by which a few girls are enable to defray the cost of a short course in Domestic Science with their own work instead of with cash. The student worker gives four months' service as dining-room girl, and in return takes the Short Course in Domestic Science. While giving her services she wears the regular student working dress, is lodged among the students and is considered as a student. The housekeeper's tact and her exceptionally fine group of employees, make the arrangement very satisfactory to the student-workers, and it is hoped this feature will become a permanent one.

A special arrangement permits a student-worker to pay $15 in cash and three months' service instead of the regular four months.

Three student-workers entered in January, two of whom dropped out almost at the beginning. Three entered in September, and three are ready to take their places in January.

Special Lectures, Meetings, Etc.

The special marketing lectures were again carried out by College professors. All were illustrated except Professor Harcourt's, who made his especially interesting with an account of some of his recent breakfast-food investigations.

They were as follows:—Vegetables, Mr. Peart; Canned Food, Professor Edwards; Fruit, Professor Hutt; Cereals, Professor Harcourt; Meat, Professor G. E. Day.

The senior chemistry class paid its customary visit to the beet sugar and other Berlin factories.

The cooking exhibit of the Fergus Fair was this year judged by Miss McPhee.

This department was represented at the Ontario Educational Association by Miss Givin and myself in the capacity of president of the Home Science Section. The work of inviting all domestic science teachers to send in questions for discussion at a round table conference, of distributing the questions for answer, and of collecting and arranging both, was undertaken by this department. The time allowed by the conference was so short, and the questions and answers so interesting and valuable to the domestic science teachers, that this department duplicated and distributed them. So many of the domestic science teachers are Macdonald Institute graduates, the labor seemed to be worth while.

I attended the meeting of the National Council of Women in Vancouver, B.C., July 15-20, as the representative of Mrs. Hoodless, vice-president for Ontario and convenor of the Domestic Science Committee. My work outside of listening attentively to the various discussions, reading the domestic science reports entrusted to me, and casting my votes in support of domestic science interests, consisted chiefly in answering questions about Macdonald Institute. Everywhere great interest was evinced in its work and possibilities. The trip out was very pleasant, as the Eastern contingent of the Council journeyed together, and made stops at Fort William, Winnipeg, Brandon, Regina, Calgary and Revelstoke, for sight-seeing, entertainments by local councils, meetings, etc. Their schedule was arranged so that the ride through the mountains and the wonderful run down the canyons from Revelstoke to Vancouver, were taken by day.

The executive committee of the National Council asked to hold their next meeting in Macdonald Institute this month at the time of the Women's Institute convention, in order to see the College and hear at first hand something of the work of the Women's Institute, one of its largest federated societies. They have received your cordial invitation to do so, and arranged their meeting for December 10-11.

Recipients of the Teachers' Certificate in Domestic Science.

A. *Graduates of the Two-year Normal Class.*

Miss Mary Evelyn Allan, Guelph.
" Jean Armstrong, Owen Sound.
" Nellie G. Carlyle, Brantford.
" Clara E. Elliot, Hamilton.
" Edith M. McKenzie, Toronto.
" Kate MacLennan, Owen Sound.
Miss Mary E. McLennan, Dartmouth, N.S.
" Ida A. Northrup, Kingston, N.B.
" Eva L. Pickett, Vittoria.
" Jessie D. Ross, Oakville.

B. *Graduates of the One-year Normal Class*

Miss Edna M. Burns, Que.
" Grace E. Dutcher, Charlottetown, P.E.I.
Mrs. A. E. Fairlie, Port Credit.
Miss Mary C. McManus, Montreal, Que.
Mrs. W. H. Muldrew, Madoc.
Miss Ethel Steinhoff, Stratford.
" Fannie A. Twiss, Hamilton.
" Edith M. Wright, Perth.

C. *Graduate of Normal Domestic Science* after credit for work in Truro School of Domestic Science and optional courses covering two years.
Miss Emma H. Bigelow ....Truro, Nova Scotia.

Recipients of the Housekeeper Certificate.

Miss Sarah Evelyn Bray, Paris.
" Mabel Mortimer, Honeywood.
Miss Robena Murdoch, Guelph.
" Alice M. Purdy, Shefford Vale, P.Q.

RECIPIENTS OF THE PROFESSIONAL HOUSEKEEPER CERTIFICATE.

Miss Ethel Tennant, Toronto.
“ Jean G. Allan, Hamilton.
Miss Erie Shand, Port Dover.

RECIPIENTS OF THE HOMEMAKER DIPLOMA.

Miss Ethelreda Briggs, St. Catharines.
“ Cecilia S. Bell, London.
“ Hilda Cayley, Toronto.
“ Grace K. Hayward, St. John, N.B.
“ Bessie Knight, St. John, N.B.
Miss Nellie Malcolm, Kinlough.
“ Barbara Palmer, Woodstock.
“ Eunice Pardoe, Toronto
“ Mary Turriff, Ottawa.
“ Carrie Zavitz, Forks Road.

SUMMARY OF ATTENDANCE.

A. January to June, completing the College year of 1906-1907.	
Normal Students	27
Senior, Sept., 1905, 10; senior, Sept., 1906, 8; junior, Sept., 1906, 9.	
Housekeeper Students	9
Senior, 5; juniors, 4.	
Homemaker Students	19
Short Course in Domestic Science	66
Winter term, 40; spring term, 26.	
Optional Course Students	26
Six months, 5; three months, 10; special evening class (12 lessons in cookery) 11.	
Public and High School classes	73
B. Summer Course in Domestic Science	11
C. September to December, opening the College year of 1907-1908.	
Normal Students	25
Seniors, September, 1906, 4; seniors, September, 1907, 7; juniors, September, 1907, 14.	
Housekeeper Students	7
Seniors, 4; juniors, 3.	
Homemaker Students	28
Two-year course, 3; one-year course, 25.	
Short Course in Domestic Science	29
Short Course in Sewing	5
Optional Course Students	3
Public and High School Class Students	52
	379
D. Students counted in both of above lists:	
In two-year courses	8
1906-1907 students returned for 1907-1908 work	3
Public School class student	1
	12
E. Total number of students in 1907	367
F. Increase in attendance over 1906	24

STAFF CHANGES.

Miss Bigelow resigned the laundry and household administration work last July. Miss Evelyn Allan, holding the Ontario first-class professional certificate and the Macdonald Institute teachers certificate in domestic science, was chosen to replace her. She has been in charge since September and is doing excellent work.

An additional teacher became necessary when it was decided to open the new short course in sewing. As usual, there was difficulty in finding a satisfactory one, because Ontario schools are not training sewing teachers, and first-class experienced graduates of the United States schools are too well paid in their own country to find our assistant's salary attractive. Miss Ethel Fonda, a graduate of Pratt Institute, New York, was finally chosen. She joined the staff in September, and is doing good work.

POSITIONS OCCUPIED BY THE 1907 GRADUATES.

Miss *Burns*, domestic science teacher in Renfrew.
Miss *Dutcher*, housekeeper and domestic science teacher in a Settlement House.
Miss *McManus*, domestic science teacher in Renfrew. (Since resigned.)
Mrs. *Muldrew*, house mother of girls' dormitory in Macdonald College, Que.
Miss *Steinhoff*, domestic science teacher in Ingersoll.
Miss *Twiss*, domestic science teacher in Galt.
Miss *Allan*, laundry and household administration demonstrator in Macdonald Institute.
Miss *Elliott*, employed in flour testing department of the Ogilvie Milling Company.
Miss *McKenzie*, domestic science teacher in Halifax Ladies College.
Miss *K. MacLennan*, domestic science teacher in Montreal Y.W.C.A.
Miss *Northrup*, engaged for domestic science teaching in St. John, N.B., in January.
Miss *Bray*, dietetic work in the Eastern Hospital, Brockville.
Miss *Mortimer*, housekeeper in General Hospital, Vancouver, B.C.
Miss *Murdoch*, housekeeper in Presbyterian Hospital, Alleghany, Pa.
Miss *Purdy*, demonstrator in the Chemical Department, O.A.C.
Miss *Bigelow*, laundry teacher in Macdonald College, Que.

Miss Warner dropped her housekeeper course within three months of completion, to take the bread experimentalist position with the Ogilvie Milling Company, when Miss McPhee came to the O.A.C.

After a year's work in Columbia University, New York, two 1906 graduates, Miss DeLury and Miss McCaig, have also joined the staff of Macdonald College, Que.

EQUIPMENT, ETC.

An effort has been made to carry out the plan of setting up an inexpensive class-kitchen equipment to illustrate what can be done in rural schools, or other places where gas stoves, plumbing, and separate rooms are out of the question. An equipment of trestle tables, cupboards and utensils has been purchased and installed in one of the rooms left vacant by the Manual Training department. It is suitable for individual work with a class of twelve and is now being tested by use with a public school class.

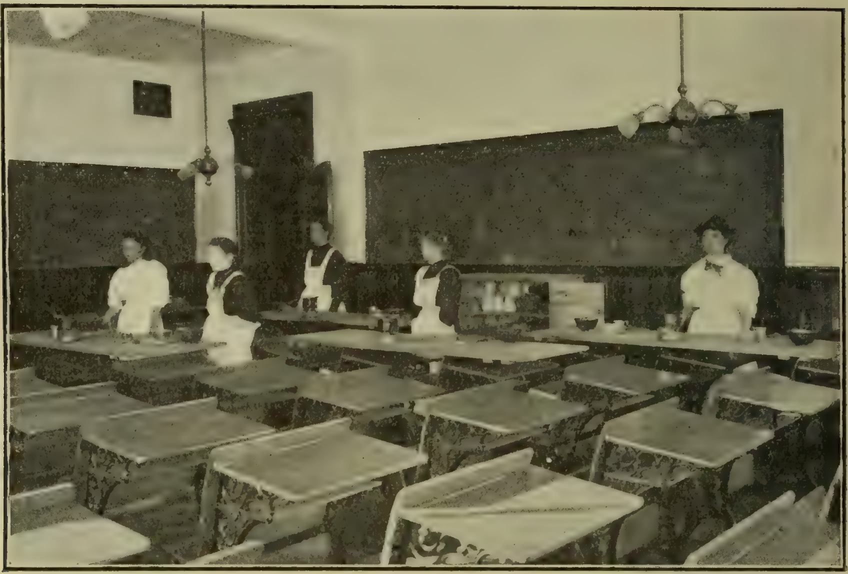
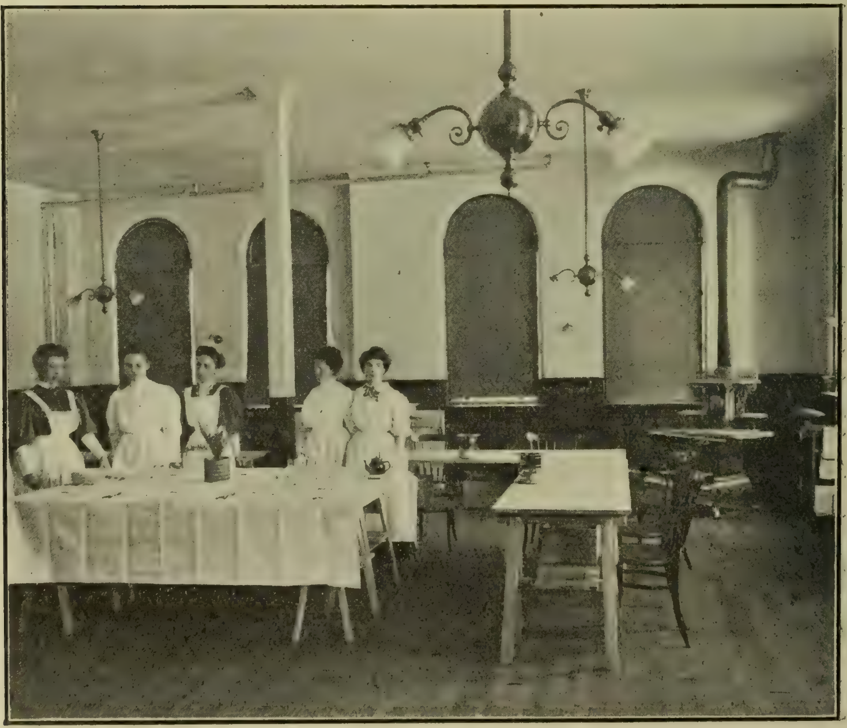


Table tops set on desks of ordinary school room.



Room equipped for a table setting lesson.

Following is a list of the equipment showing the exact cost of each item:

Article.	Cost.
12 Bowls, brown	85
12 Bread tins	95
12 Teacups & saucers	1 25
12 Tin measuring cups	1 25
12 Egg beaters	30
12 Forks	50
12 Case knives	1 25
12 Paring knives	1 25
12 Plates	85
12 Saucepans	1 68
12 Tablespoons	50
24 Teaspoons	40
12 Wooden Spoons	60
12 Stewpans	2 40
12 Strainers	65
2 Trays	80
1 Bowl, yellow	25
1 Bowl, do	35
1 Bowl, do	45
3 Scissors	1 50
5 Trestle Tables	20 55
6 Frying pans	90
3 Tea strainers	15
3 Match box stands	24
1 Emery knife	20
3 Soap dishes	25
12 Pepper shakers	1 50
12 Salt shakers	1 50
1 Bell	50
4 Lemon Reamers	40
6 Stoves, kerosene	6 00
12 Plates, dinner	1 25
6 Plates, soup	60
4 Jugs	60
1 Jug	45

Article.	Cost.
1 Butcher knife	30
1 French knife	60
2 Spatulas	80
6 Teaspoons	10
3 Tablespoons	13
4 Brushes	20
2 Stove mitts	50
4 Asbestos mats	20
1 Corkscrew	25
4 Egg beaters	60
4 Wash basins	92
3 Draining pans	69
4 Dishpans	2 00
6 Broilers	48
3 Cake tins	35
4 Graters	40
3 Strainers	75
24 Pattie pans	20
2 Tin dippers	40
2 Fibre pails	70
1 Colander	35
1 Pail, enamel	70
1 Pan, enamel	18
3 Tea kettles	2 70
1 Saucepan	30
1 Saucepan	25
1 Saucepan	23
1 Saucepan	30
1 Double boiler	85
1 Kettle, covered	60
*1 Stove (to burn coal or wood).	30 00
Total	$100 05

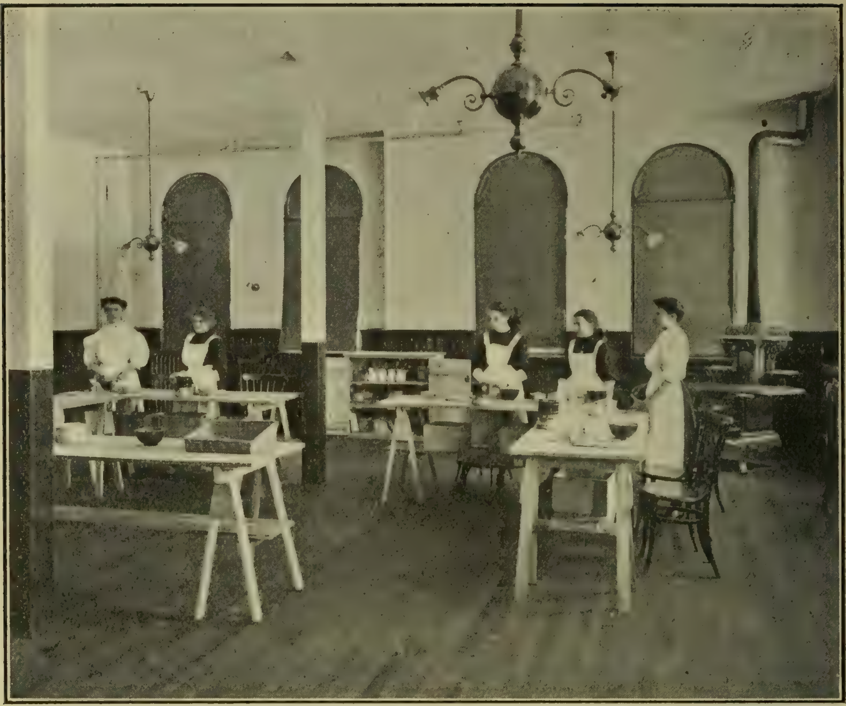
*The above may be replaced by a twenty-dollar wood stove or a ten-dollar two burner coal oil stove.

The whole equipment is attractive, and is capable of modifications which will adapt it to the conditions of many schools. The Ontario Educational Department offers generous assistance to the schools which teach domestic science, and it is hoped this equipment will encourage the spread of domestic science teaching from the cities and towns to the village and rural schools.

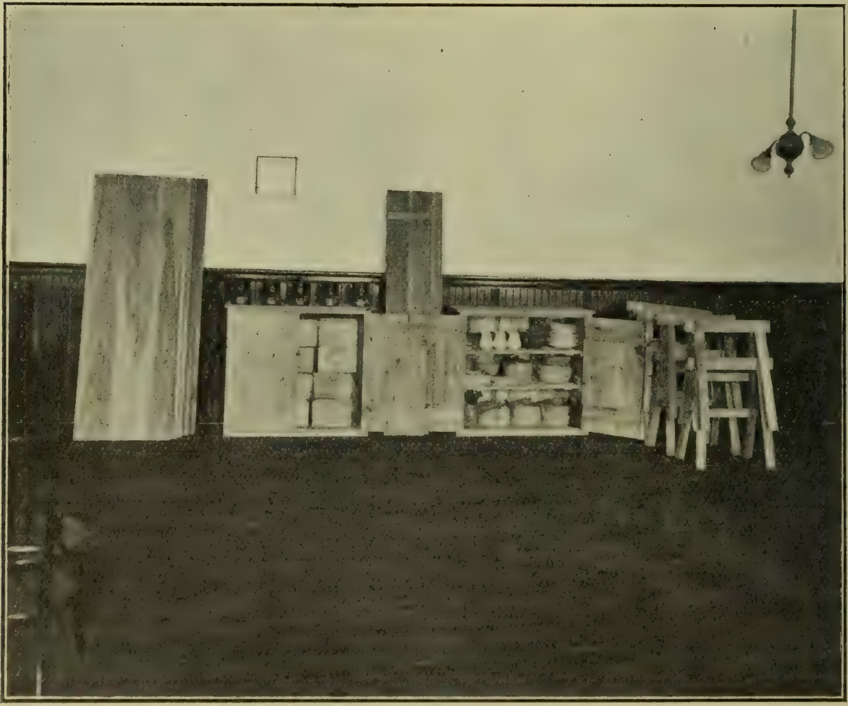
The sewing department has been aided by the addition of several really good fashion magazines and some illustrative material. If we are to work out a course in color-harmony as applied to dress and home furnishing, we shall need considerable additions to the latter.

The physiology work has been greatly benefited by the skeletons and models added to the physiological collection.

The laundry class-room arrangements for washing and drying clothes have been satisfactory from the first, but those for ironing and heating irons proved inadequate. The common kitchen tables were not large enough for two students, and so much room was occupied by chairs and stove that more tables were out of the question. Half the class was obliged to walk the length of the large room for each hot iron, and the heat of the room proved very trying in warm weather. These difficulties have been done away with by transferring the wood stove to the new rural school equipment, running a gas pipe along the back of the tubs which stand around three sides of a



Room equipment for cooking lesson.



Showing equipment stowed away compactly as possible.

square in the middle of the room, and attaching six small gas flat-iron heaters with swing joints so that they can be swung forward on a board across the tubs when in use, and swung back out of the way when the tubs are in use. The old tables and chairs have been replaced by new tables. The top of the table swings back to form the back of a four foot bench, the seat of which is the cover of a box that holds all the laundry equipment of basins, spoons, knife, ironing blanket, sheet, choths, etc., needed by one student. While writing notes two girls use one table as a bench and the other to write upon. This gives each student an ironing table with hot irons within easy reach. The whole arrangement is very compact, and a substantial desk with a paraffined top completes a room for which we shall no longer have to apologize.

The attendance next term promises to exceed that of this year's winter term. If all of the present long course students return after Christmas and all of the accepted short course students claim their places, optional students will have to board outside, as Macdonald Hall will be filled with regular students.

I beg to acknowledge the efficient work of the other members of the Home Economics staff, and the valuable help given to this department by many of the other departments.

Respectfully submitted,

MARY URIE WATSON.

PART XVIII.

THE PROFESSOR OF MANUAL TRAINING.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit for your consideration my fourth annual report on the work of the Manual Training and Farm Mechanics Department for the year 1907.

We vacated our rooms at the Macdonald Institute for the more commodious new building designated "Machinery Hall," with its perfectly lighted and larger rooms, additional machinery, tools and implements, early in April. A fairly good description of this building was given in my last report. There is, therefore, no need of entering into detailed account of the structural features, conveniences and accommodation afforded by the "Hall" for carrying on the various branches of work of this department.

Machinery Hall, Macdonald Institute, Guelph.

We trust that our new quarters, with better and more efficient means of instruction, will be productive of intellectual and ethical development in our students, for what is now needed are men who know the fundamental laws of nature and how to apply them, and, above all, men who understand the nature and handling of machinery. The opportunities offered in these rooms to learn the great truths of Nature, and how her immutable laws are applied in various ways for the welfare or comfort of mankind, should help to awaken in the student the realization that the prosperity of our agricultural community depends, not so much on the produce of her soil, as upon improved implements and machinery for the better cultivation of the land and greater success in more expeditious handling and harvesting of the crops. From the reaping hook and cradle to the modern self-binder is a far cry. Machinery to-day is doing the worlds' work, and that granted, it follows that our graduates taught how to handle machinery are equipped for the world's work, and for the gaining of an honorable livelihood. The management of complicated machinery, like that of a self-binder, demands brain power rather than mere muscle to be able to work a machine in accordance with its greatest efficiency. The time spent by our students at the forge, benchwork, and farm mechanics affords a sound basis for correlation of studies, but the time devoted to this work should be extended: the maximum number of hours given to each subject is but six hours during the whole term. More important still, in my opinion, is the initiation of all into some of the fundamental and typical processes in farm operations in which implements and machinery are able to assist and benefit mankind.

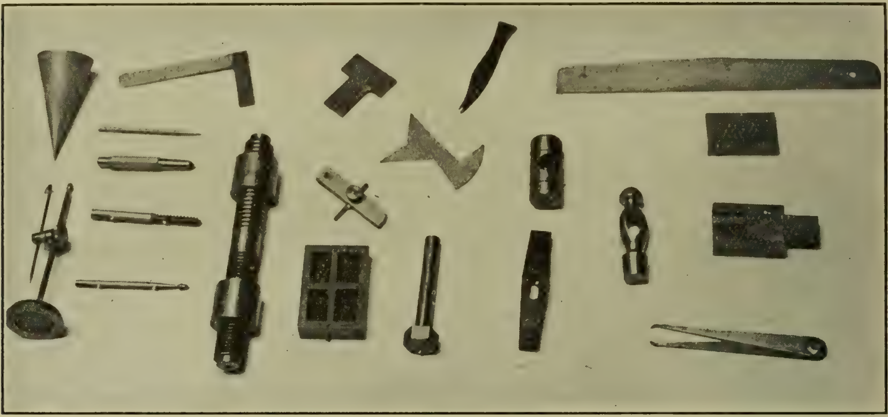
Speaking before the Iowa Implement Dealers' Association, Mr. Henry Wallace is reported to have said:

> "As farm labor becomes skilled labor, the farmer cannot use the ordinary labor of the city, of the factory, or of the railroad. Farming has become a profession, requiring the highest intelligence and the highest skill, and this always requires a higher relative wage, when board and lodging are considered, than can be given to labor in the city or town. This high-priced labor requires him to use animal help instead of human muscle; and brings me to the second reason, namely, the need of more expensive machinery.
>
> "The farmer can no longer do with the eight-foot harrow run by two horses. It must be a sixteen, twenty-four, or thirty-two foot, drawn by four horses. He must, if he is to meet the demands of the coming millions, bring his soil into better physical condition. This requires a different class of implements, a heavier plow, the disk and the disk roller, the spading harrow; for it is not three or four inches of soil that he is now cultivating, but six, eight or ten. He begins to realize that if he is to use the carbon and the nitrogen of the air as well as the fertility of his soil, he must put it in better physical condition and do more thorough tillage, and this means that he must have improved machinery, which, again, requires higher intelligence for its use and higher-priced labor."

With the increased space and better facilities, the scope of the work rapidly widened, rendering arrangement of the classes between two men somewhat difficult. Indeed, we were constrained to seek temporary help for the Summer School, and again for the present fall term. For the Summer School we secured the services of Miss Powell of London, Ont., who took the Constructive and Art work. This arrangement relieved Mr. Kendall and myself to apply our energies to the Forging, Benchwork, and Machine shop practice. In the fall term when the Second Year men came up for Forging, Benchwork, and Farm Mechanics, the same difficulty was experienced. The class aggregated sixty-two in number, divided into two divisions. Each division had to be arranged into three sections, Forging, Benchwork, and Gasoline Engines and Farm Mechanics, so that it was inevitable we should get more teaching assistance. In the person of Mr. R. W. Wade, B.S.A., of the Animal Husbandry Department, we found an agreeable colleague and an able instructor, with considerable practical experience in handling farm implements, and a sound knowledge of the mechanism of farm machinery. He was good enough to give us of his time two afternoons a week. I feel it justly due to Mr. Wade to express our grateful appreciation of his having so willingly assumed and so faithfully performed the task allotted him. It also gives me great pleasure to acknowledge and record the valuable assistance rendered by Miss Powell and her kindly cooperation in the work of the Summer School; and to testify to the uniform work performed by Mr. Kendall throughout the year.

Attendance: Winter term 1907; First year, 79; Second year, 66.
Fall term, Second year, 62.

The instruction in Farm Mechanics has been supplemented by visits to several factories in the City of Guelph, manufacturing agricultural implements and gasoline engines. Two afternoons were spent by the Second Year men during the fall term in the showrooms and workshops of the Louden Machinery Co., Tolton Bros., and the Gilson Manufacturing Co., investigating the construction and latest improvements in the goods turned out by these firms. Considerable amount of time had been given to prepare the showrooms for the practical demonstrations, by having a variety of implements and machinery arranged and fixed up to illustrate the merits of the inventions. Thorough explanations of the working parts were given by the managers of the respective firms. We tender these gentlemen and their firms our sincere thanks for the privilege of spending so much time in their workshops gathering most useful and profitable information regarding farm implements, machinery, and gasoline engines.



Course in Machine Shop Practice; Bench and Vice Work.

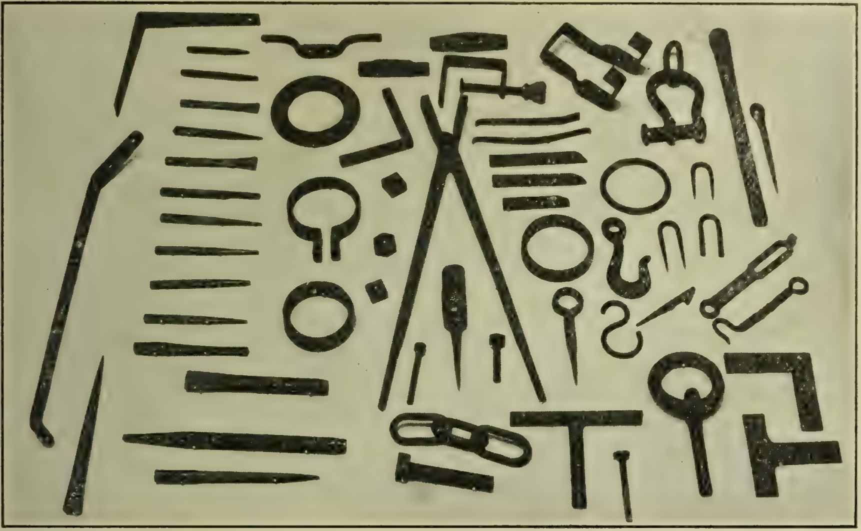
It is with great pleasure I have to announce that the Loudon Machinery Co. has offered a prize of $20, confined to the present Second Year students, for the best plan of a barn to accommodate twenty head of cattle, five horses, and all the necessary adjuncts which such a building should contain in the way of root cellar, loose boxes, pens, etc. They are also prepared to fix up in the "Hall" any piece of machinery, in their line, we may choose to select.

We are indebted, too, to the Gilson Manufacturing Co. for donating a two and a half horse power gasoline engine, and to Mr. Brown of the Aspinwall Manufacturing Co., Jackson, Mich., for the gift of a potato planter, sprayer, cutter and sorter.

In this connection I would like to mention that we require for demonstration work with power, all kinds of light machinery, such as grinders, pulpers, sprayers, cream separators, and such parts of field machinery as the "Knotter" of the self-binder, the cutting and gearing mechanism of the mower, so that the students may become familiar with the parts before attempting the entire machine.

Power on the Farm.

The problem of power on the farm is becoming an important question in view of the economic state of the labor market. The farmer, realizing these conditions, is turning his attention to studying the possibilities of the application of motive power to perform many operations now done by hand labor. There are two classes of power necessary for agricultural work—the tractive force and the belt power. So far as the tractive force is concerned the demand seems to be for a light engine of from twenty to fifty horse power, that can be hitched on to any existing machine or implement on the farm and form, as it were, a part and parcel of the whole, without any additional "dead" wheels.



Course in Forging.

One of the Optional Courses—Art Metalwork—Combination of Wood and Metal.

"Considerable development has been made within the year in motive power for the farm, as the following account of Motor Harvesting feats will show:

"An interesting demonstration of the possibilities of motor harvesting was given at Kirton in Lincolnshire, recently, when growing grain was made into bread in four hours, loaves being handed round which has been produced from the grain standing in the field that period of time previously. The trials took place on a farm belonging to Messrs. Dennis Brothers, and they constituted an excellent example of up-to-date rapid harvesting.

"An acre of standing grain was marked out in a field. At 11.35 a.m. a 50-horse power agricultural tractor by Messrs. H. P. Saunderson & Co., Ltd., of Elstow Works, Bedford, drew a thrashing machine into the field and a few minutes later the tractor was coupled to two Massey Harris binders. Half a dozen men walked behind and stooked the sheaves as they fell, and in about a quarter of an hour, the acre was cut and stooked. The tractor was then connected to a cart, which was loaded in the usual way, and the wheat was carried to the thrashing machine in another part of the field, and there it was thrashed, the motor driving the thrasher. By one o'clock the thrashing was ready to begin. At ten minutes past one, a halt was called for luncheon. As soon as the thrashing had begun, the flour was seen to come out of a grain grinding mill, which was worked by a belt from a pulley on the thrashing machine. The tractor then took a 3-furrow plow to another field, and at 3 o'clock plowing began, the furrows being 10 inches in width and 7 inches deep. An acre of land was finished at 4.45 p.m., this time including half an hour's halt for an over heated bearing. A cultivator and seed drill were then hooked on behind, and at 5.30 p.m. the acre was ready for the harrow, which finished its work at 6.45 p.m. After deducting the luncheon interval and the stop due to the bearing, the net time occupied was 6 hours 40 minutes, for cutting, binding, thrashing, and grinding one acre of grain; and ploughing, drilling, harrowing one acre of land ready for a new crop.

This is certainly good work, and shows how much can be accomplished by motor-driven implements. Demonstrations of this character should do much to popularize the use of agricultural motors. We have ever held that light agricultural motors will one day be as freely used and as popular indeed as are mowing and reaping machines, and the proofs that continue to come forward regarding their economy and general usefulness certainly strengthen this belief. A propos of up-to-date farming, Mr. A. Burness Creig of Winnipeg is, we notice, just now advocating the use of a strong steam driven cultivator every third or fourth year, going to a depth of 12 or 14 inches, and using narrow chisel points, so as not to bring the subsoil to the surface."

As to the belt power, it is now conceded that much useful work can be accomplished by engines burning gasoline, kerosene, or alcohol as fuel. These engines are easy to understand and require but little attention while running. For pumping, churning, and for running small machines, such as cream separators, small pulpers and straw cutters, a power ranging from two to five horse power will do very effective work, but for larger grinders and feed cutters, it will require an engine of from eight to twelve horse power.

The United States Government experts who have been investigating the use of alcohol in internal combustion engines have prepared a bulletin covering it at some length. Their findings are summarized in the following conclusions:

1. Any engine on the American market to-day, operating with gasoline or kerosene, can operate with alcohol fuel without any structural change whatever with proper manipulation.

2. Alcohol contains approximately 0.6 of the heating value of gasoline, by weight, and in the department's experiments a small engine required 1.8 times as much alcohol as gasoline per horse power per hour. This corresponds very closely with the relative heating value of the fuels, indicating practically the same thermal efficiency with the two when vaporizing is complete.

3. In some cases carbureters designed for gasoline do not vaporize all the alcohol supplied, and in such cases the excess of alcohol consumed is greater than indicated above.

4. The absolute excess of alcohol consumed over gasoline or kerosene will be reduced by such changes as will increase the thermal efficiency of the engine.

5. The thermal efficiency of these engines can be improved when they are to be operated by alcohol, first by altering the construction of the carbureter to accomplish complete vaporization, and second, by increasing the compression very materially.

6. An engine designed for gasoline or kerosene can, without any material alterations to adapt it to alcohol, give slightly more power (about 10 per cent.) than when operated with gasoline or kerosene, but this increase is at the expense of greater consumption of fuel. By alterations designed to adapt the engine to new fuel this excess of power may be increased about 20 per cent.

7. Because of the increased output without corresponding increase in size, alcohol engines should sell for less per horse-power than gasoline or kerosene engines of the same class.

8. The different design of gasoline or kerosene engines are not equally well adapted to the burning of alcohol, though all may burn it with a fair degree of success.

9. Storage of alcohol and its use in engines is much less dangerous than that of gasoline, as well as being decidedly more pleasant.

10. The exhaust from an alcohol engine is less likely to be offensive than the exhaust from a gasoline or kerosene engine, although there will be some odor, due to lubricating oil and imperfect combustion in the engine if not skilfully operated.

11. It requires no more skill to operate an alcohol engine than one intended for gasoline or kerosene.

12. There is no reason to suppose that the cost of repairs and lubrication will be any greater for an alcohol engine than for one built for gasoline or kerosene.

13. There seems to be no tendency for the interior of an alcohol engine to become sooty, as in the case with gasoline and kerosene.

14. With proper manipulation there seems to be no undue corrosion of the interior due to the use of alcohol.

15. The fact that the exhaust from the alcohol engine is not as hot as that from gasoline and kerosene engines seems to indicate that there will be less danger from fire, less offence in a room traversed by the exhaust pipe, and less possibility of burning the lubricating oil. This latter point is also borne out by the fact that the exhaust shows less smokiness.

16. In localities where there is a supply of cheap raw material for the manufacture of denatured alcohol, and which at the same time remote from the source of supply of gasoline, alcohol may immediately compete with gasoline as a fuel for engines.

17. If, as time goes on, kerosene and its distillates become scarcer and dearer, by reason of exhaustion of natural deposits, the alcohol engine will become a stronger and stronger competitor, with a possibility that in time it may entirely supplant the kerosene and gasoline engines.

18. By reasons of its greater safety and its adaptability to the work, alcohol should immediately supplant gasoline for use in boats.

19. By reason of cleanliness in handling the fuel, increased safety in fuel storage, and less offensiveness in the exhaust, alcohol engines will, in part, displace gasoline engines for automobile work, but only when cost of fuel for operation is a subordinate consideration. In this field it is impossible to conveniently increase the compression because of starting difficulties, so that the efficiency can not be improved as conveniently as in other types of engines.

20. In most localities it is not likely that alcohol power will be cheaper or as cheap as gasoline power for some time to come.

A NEW BINDER.

It is highly important in this machinery age that farmers are kept in touch with all that is going on.

> "A radical modification in binder construction is in the field evolved by Mr. Samuel Millar, a practical farmer of Otago, New Zealand. It is said Mr. Millar has spent four years in working out this new type of harvester. The main advantages claimed for it are that there are no canvases (in itself a great saving); there is not a cog on the machine. The crop is cut, conveyed to the binder, and tied and discharged all on the vertical. The machine has neither spur wheel nor chain, and is simplicity itself. The driver works the entire contrivance without having to move from his seat. It has been found to act to perfection in short crops, and especially in rye grass, and it is claimed that it will cut and tie anything form six inches in height upwards. The ordinary harvester weighs from 16 cwt. to a ton, but Mr. Millar's patent weighs only 9 cwt. and will probably be made considerably lighter. It is stated that two horses are able to draw it without strain for eight hours, which, as every practical farmer knows, is a vast improvement on existing conditions. The yolk—itself a valuable invention—is on the pulley system, and is so arranged that each horse is made to do its fair share of pulling. The main drive wheel is 4 feet 6 inches, but can be geared up to any requirement, and the raising or lowering of the cutters is regulated by means of lever, manipulated like everything else, by the driver from his seat. The knotter is another remarkable patent connected with this machine. It is much simplified, and has no bevel wheels to get out of gear. This harvester-binder has come through many preliminary trials most successfully, and is to be put through sundry other exhaustive tests during the next harvest."

NORMAL COURSE IN MANUAL TRAINING.

The purpose of this course is to give the professional trained teacher desiring to become an instructor of Manual Training an adequate and efficient training in the theory and practice of the subject. The course extends over twelve months and embraces a wide range of practical and theoretical work.

The full course was taken by Mr. John Burchill, M.A., Cobourg; Mr. A. N. Scarrow, Bradford; and Mrs. J. E. Lyon, Guelph. These three students passed successfully the prescribed examinations and have been awarded the College Diploma. Messrs. Burchill and Scarrow also received the Education Department's Certificate as "Specialists" in Manual Training. Both have resumed their former positions which they held prior to coming to Guelph. Mr. Scarrow, however, will take up, in January, 1908, the Instructorship of Manual Training at the Owen Sound Collegiate Institute, *vice* Mr. J. H. Cunningham, who has been appointed on the staff of Manual Training Instructors in Toronto. Mr. Cunningham attended the Special Summer Course in Metalwork of this year, wrote off his outstanding examinations, and was granted the College Diploma and the Education Department's Certificate as Specialist.

The following took up supplementary work in Forging, Benchwork and Machineshop practice at the Special Summer Course:

Edward Faw, St. Thomas; A. J. Painter, Guelph; R. N. Shortill, Guelph; H. Winchester, Ottawa; J. Slaughter, Toronto.

Messrs. Faw, Painter, and Shortill sat for the theoretical examination, and the papers submitted proved highly satisfactory. They were given the College Diploma. The former is entitled to the Education Department's Certificate as "Specialist" and the latter to a certificate as teacher of Manual Training.

Mr. Winchester received the College diploma. Mr. Slaughter was given credit for his woodwork. He completed the practical part of the Metal-working Course, but did not take the examinations.

The following attended the Summer School and did some post graduate work in metal:

W. W. Snider, Ottawa; Chas. T. Yeo, Ottawa; D. H. Houston, Berlin.

In addition to the above there were in attendance at the Summer School thirteen taking the regular course in Constructive and Art work and twenty-eight Nature Study Students for two mornings a week.

Nature Study Correlated Course.—The aim is to afford the students attending the regular Nature Study Course opportunity to obtain a reasonable knowledge of the operations and manipulations of woodworking tools, Constructive and Art work, so far as their application can be adapted in dealing with simple construction and its correlation with the other lines of school work.

Number of students during Fall term, 1906, 11; Spring term, 1907, 12; Summer School, 1907, 28.

Optional Courses.—The instruction offered is mainly of a recreative character in Wood and Metal to meet the requirements of students attending the Home Economics Department who desire to spend profitably any spare period they may have from the regular course in Domestic Science.

Attendance during Fall term, 1906, 20; Winter term, 1907, 38; Spring term, 1907, 21; Fall term, 1907, 13.

There are thirty-five additional Domestic Science students receiving a regular course in Color and Household Decoration.

I have the honor to be, Sir,

Your Obedient Servant,,

JOHN EVANS.

PART XIX.

THE PROFESSOR OF NATURE STUDY.

To the President of the Ontario Agricultural College:

Sir,—I have the honor to submit my third annual report on the work of the Nature Study Department.

The Macdonald Scholarships.

Perhaps the chief matter of interest in this Department to report for the year 1907 is the closing of the College's direct concern with what has been generally known as "The Macdonald Movement." The three-year agreement whereby selected teachers from the five eastern Provinces were to be given free instruction in Nature Study and allied subjects ceased in June with the departure of the last interprovincial class. During this time a significant educational movement has been in progress. Two hundred and two Canadian teachers have been brought together into one institution from a territory extending over a length of 3,000 miles with the intent of re-directing the instruction in their schools to the common things of nature and life. For the three months of their courses, they lived together in the Hall; worked together in laboratory, workshop and garden; studied together in field, woods, campus, and classroom; tramped together along country roads and by streams; visited schools, factories, and College departments. The East became West, the West became East, and the middle widened to the two directions. They were times of educational expansion for individual teachers; sympathies broadened, outlooks widened, provincialism atrophied, national sentiment expanded.

Most of these teachers are now scattered in rural and urban schools throughout our land. And while we have no direct, regular account of their work, we hear indirectly from School Inspectors and irregularly from themselves of their success in handing down to their children some of the good things they themselves received at Guelph. Some are acting as supervisors of Nature Study in training schools, or in graded schools of towns. Many extend their influence amongst their fellow teachers by papers, or demonstrations at teachers' conventions. It may be fairly said that while the Macdonald Movement has ceased so far as classes in Nature Study at Guelph are concerned, it goes on in the common schools of the land wherever our teachers have gone. It was and is a national movement in education in which our College may feel proud to have taken part. For the continuance of it at the new Macdonald College at Ste. Anne de Bellevue our best wishes are extended. It is to be hoped that some day in the near future our provincial Departments of Education, acting conjointly with the Federal Government, may recognize and adopt some such scheme as this promoted by

Sir Wm. Macdonald as a very proper and necessary plan for bringing about a national unity in education. The following table shows the distribution of the teachers:

	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Extras
Fall, 1904	5	6	6	6	12	
Spring, 1905...	4	8	7	12	14	5
Fall, 1905.....	5	8	9	6	17	
Spring, 1906...	6	8	6	12	14	4
Fall, 1906.....	4	..	..	3	3	1
Spring, 1907...	6	..	..	5	..	1
Totals	29	30	28	44	60	11

The grand total was 202. The extra students entered the classes without nominations in Macdonald Scholarships. They came from the western provinces, England, and Ontario.

THE SPRING CLASS OF 1907.

This interprovincial class, like that of the Fall term of 1906, was not very large nor representative. In Ontario, the scholarships were offered again, but owing to the scarcity of teachers and the consequent difficulty in obtaining substitutes, the lateness of the decision of the Department of Education to continue the scholarships, and the withdrawal of the supplementary grant by the Macdonald Rural Schools Fund for mileage and other expenses, no candidates were forthcoming. While the months of April, May and June are the best months for our work in Nature Study, as a rule they are the busiest in our schools and only a few teachers can feel free to leave their classes and enter on a course of study.

The class was composed of the following:—

Prince Edward Island:

Miss Frederica Campbell, Park Corner.
Miss Theodosia Gallant, Mt. Carmel.
Mr. Daniel S. MacInnes, St. Peter's.
Miss Eva W. MacMurray, Charlottetown.
Miss Evangeline Matheson, Dundas.
Miss Isabel Nash, Charlottetown.

Quebec:

Miss E. J. Ewing, Pike River.
Miss May G. Johnson, Levis.
Miss Henrietta Jones, Richmond.
Miss Frances Scott, Iron Hill.
Miss Lila M. Wainman, Shawville.

Great Britain:

Miss Minnie Hardy, East Dulwich.

THE NATURE STUDY COURSE AND ELEMENTARY AGRICULTURE.

The usual course of study as outlined in the College Calendar was taken. Visits were paid to all departments of the College and in most of them short courses of instruction were arranged for. In English, Prof. Reynolds took up the study of Canadian writers and the leading nature poets; in Physics, Mr. W. H. Day gave instruction in elementary meteorology, soil physics and in astronomy; in Chemistry, Prof. Harcourt gave instruction in soils and plant foods; in Bacteriology Prof. Edwards and Mr. Barlow covered a practical course suitable to the needs of the public school teacher; in the Art work and Manual Training, correlated to Nature Study and School Gardening, Prof. Evans and Mr. Kendall gave the instruction; in Agriculture, Prof. Zavitz and Mr. Buchanan gave instruction in farm crops, experimental work, etc.; in Dairying, Prof. Dean and his assistants instructed in milk testing, care of milk, etc.; in Poultry, Mr. Graham took up work on the common breeds of domestic fowl and their care; in Animal Husbandry, there was instruction by demonstration and lecture in the breeds and care of farm animals by Prof. Day. In Horticulture, Prof. Hutt and Mr. Hunt took up plant propagation, improvement of school grounds; in Entomology, Dr. Bethune took the class for laboratory and field work; in plant study, Mr. Eastham assisted. It will thus be noticed that the whole College assisted in giving instruction to the Nature Study class in the elementary knowledge and principles of agriculture; it is towards this side of the subject that our Nature Study work here has been naturally tending. Indeed it is a question if it may not be more faithfully designated by the term Elementary Agriculture. Such a development accords with one of the fundamental working principles of Nature Study teaching, viz., to use for instruction the materials and means that lie near and enter into the concerns of our everyday lives. The students were surrounded by a College influence which was brought to bear on their education. This, instead of confining interests to one or two departments.

School Gardens.

Our out-door School Gardens were not so successful this term as previous gardens. This was owing to our having taken a new piece of poorly prepared ground to the east of the gardens of the Consolidated School. However, the success of school gardening is not measurable in garden products and our teachers probably received as much benefit, practically and pedagogically in the use of this adversity of soil as they would have had under kindlier conditions.

A School-Master's Garden.

The gardens were planned and planted this term as a schoolmaster's garden. This was to avoid the disorder that the gardens of previous classes fell into at term's close in June. While the experiment was a success so far as to attaining a better appearing garden in July, August and September, it went to show that teachers (and no doubt the same thing would obtain in children's gardening) have more interest and get more pleasure in a garden that is their very own, even if they must leave it before much growth is showing.

The term closed with a visit to Niagara Falls and Toronto. Special thanks are again due Mr. Gearie, of Niagara Falls, for his kindly interest in our visit to the battlefield at Lundy's Lane; there in the cemetery where the dead were buried and where monuments commemorate the victory and Laura Secord's daring deed, he graphically described all the details of the fighting. Afterwards he showed us many curios reminiscent of the early history of the Niagara peninsula. Needless to say, it was one of the best taught history lessons that our teachers had ever had.

For our inspection of The Ontario Power Company's plant, thanks are due Mr. J. W. Wilson, Superintendent of the Queen Victoria Park. At Toronto visits were made to the Normal School, the Colleges, and some of the Public Schools.

Summer Class of 1907.

By an arrangement with the Education Department, all the Summer School work for teachers this year—outside of that done by the University—was delegated to the Macdonald Institute. This was owing to the Normal Schools at London, Toronto and Ottawa being engaged in special courses for the teachers in Separate Schools. Arrangements were made for the lady teachers to board in Macdonald Hall, and new courses were offered in Domestic Science and Manual Training.

While the attendance in the three courses was larger than what we have previously had in Nature Study alone, it did not nearly equal the enrollment of summer schools at the Normal centres. Our teachers who take summer courses would seem to prefer to go to larger cities. They have still to learn that the attractions of our beautiful College surroundings and a few weeks' stay at the Hall fully compensate for the loss of the city's summer attractions.

The following composed the class:

Miss Beatrice Barber, Corinth.
“ Elsie Blackmore, Toronto.
“ Minnie Bennett, Acton.
“ Mabel Book, Silverdale.
“ Vivian Clayton, B.A., Listowel.
Mr. W. F. Darroch, Brantford.
Miss Isabella Duff, Lakefield.
Mr. J. P. Ferguson, Stirton.
Miss Marion Hamilton, Toronto.
Mr. John E. Hanlon, Guelph.
Miss Eva Henderson, Underwood.
“ Minnie Holmes, Acton.
“ Martha Langford, Cameron.
“ Grace Mortimer, Guelph.
Mr. H. A. Munro, Toronto.
Miss Janet McKinley, Forest.
“ Amy McKowan, Bond Head.
“ Lillie McLean, Bowmanville.
Mr. Thomas Packer, Elmvale.
Miss Effie Polley, Sarnia.
“ Marion Porteous, London.
“ Libbie Porter, Sault Ste. Marie.
“ May Neelands, Forest.
Mr. P. O. Nelson, Warkworth.
Miss K. S. Rolston, Caledonia.
“ Ada Short, Toronto.
“ Ida Smith, Petrolia.
Mr. John Urquhart, B.A., Dundalk.

The work of the summer class followed in general the course outlined in the Calendar. In school gardening we had the enthusiastic help of Mr. J. W. Gibson, who has had oversight of the Macdonald school gardens of Carleton County for the past three or four years.

The enjoyment and progress in the work was enhanced not a little by lodging the lady teachers in Macdonald Hall, and it is to be hoped this privilege may be continued; the demeanor of the class of 1907 proves there is little fear of the privilege being abused by infringement of College rules, even though the session is somewhat of the nature of a summer recreation.

Teachers' Conventions.

There have been three conventions of teachers held at the College during the year.

May 22 and 23—East Huron Teachers' Institute.
October 3 and 4—North Simcoe Teachers' Institute.
October 3—North Wellington Teachers' Association.

Special care is taken to make these visits pleasant and profitable to the teachers. As far as time permits, they are introduced to the many-sided operations of the different departments. Some are interested in one thing, some in another; but in every case something in the nature of a new idea or a new inspiration is taken back to the boys and girls in the public schools. This is in most cases the only "Agriculture in the Public Schools" presented in our schools. But an interest in the subject is quickening in the minds of many teachers and inspectors. In the meantime they are learning where and how they may be helped.

Visit of Dominion Educational Association.

On July 13th we had a visit from a party of representative Canadian teachers who had been in attendance at the Dominion Educational Association in Toronto. They were entertained at Macdonald Hall and after dinner impromptu addresses were made by delegates from the different Provinces. Our summer students enjoyed the experience very much.

The following comprised the party:

Nova Scotia:
Miss Blanche Atkinson, Maccan.
“ Mary I. Moseley, Halifax.
“ Mary F. Ball, 170 Portland St., Dartmouth.
Miss Mabel V. Bigney, Amherst.
“ Anna L. Bigney, Amherst.
Mrs. E. J. Willis, Halifax.

New Brunswick:
Miss Isabel R. Everett, Fredericton.
“ Margaret R. Graham, St. John.
“ Fannie McLaren, Moncton.
“ Maud Gibson, St. John.
“ Ellen Barton, St. John.
Miss Catharine Barton, St. John.
“ Mary Anderson, St. John.
“ A. M. Hea, St. John.
“ Ella L. Thorne, Fredericton.

Ontario:
Miss Eva Findlay, Sturgeon Falls.
“ Annie Douglas, Uxbridge.
Mr. V. J. Murphy, C.S.B., Toronto.
Mr. F. G. Joblin, Toronto.
Mr. Thomas Packer, Elmvale.

Manitoba:
Miss Ada B. Speers, Brandon.
“ A. Holden, Boissevain.
Mrs. J. H. Glover, Boissevain.
Miss Susie Youghusband, Winnipeg.
Mr. D. McDougall, Brandon.
Mr. B. J. Hales, Brandon.
Mrs. B. J. Hales, Brandon.
Miss Marion M. Hales, Brandon.

Saskatchewan:
Miss Effie Bready, Radisson.

British Columbia:
Mrs. Agnes Deans Cameron, Victoria (404 Marquette Bldg., Chicago).
Mr. C. McLean Fraser, Nelson.

Addresses on Nature Study subjects or Agriculture for the Public Schools have been given before the following:

May 17th—Teachers' Association, Stratford.
November 8th—South Essex Teachers' Association, Leamington.
November 15th—Haldimand Teachers' Association, Caledonia.

Visitors, Special Lectures, Etc.

Our classes, as usual, had the advantage of hearing special addresses by well-known men.

On May 11th Prof. C. A. Zavitz lectured on "A Visit to the United States and Europe."

On May 23rd, Mr. W. E. Saunders on "Bird Life."

On July 4th, the Ontario Entomological Society held a special summer session at the College, which was attended by our Nature students. The next day the members and students of the summer class fraternized at Puslinch Lake. Interesting addresses were given in Macdonald Institute by Dr. Fletcher of Ottawa on Natural History in the Schools, and by Dr. Skinner of Philadelphia on Disease-Carrying Insects, and in the field by Messrs. Williams, Brodie, and Nash of Toronto.

On July 19th Professor Reynolds gave a lecture to the summer school on Canadian writers, and on July 23rd, on Shakespeare.

On July 24th, Mr. W. D. Hobson, of Woodstock, gave us a talk on birds, imitating in a wonderful manner the songs of many of them.

On October 3rd and 4th Dr. Hogben, Director-General of Education for New Zealand, visited the College and kindly took part in the meetings of the North Simcoe Teachers' Association, which was in convention at the time. His remarks regarding the status and salaries of their teachers, the progress of school gardening and agriculture in the public schools, the successful workings of the teachers' pension fund, greatly impressed his hearers with the progressiveness of our fellow colonists of the southern seas in matters of education.

During the spring term the Wellington Field Naturalists' Club held its meetings in our Nature Study classroom and they were attended by our teachers-in-training with great profit, as much interesting nature material was reported on or brought in.

Training of Teachers Elsewhere.

This question of the special training of teachers for rural schools is being solved in different places in different ways.

In the Province of Quebec, the normal school has been removed from the city of Montreal and incorporated with The Macdonald College of Agriculture at Ste. Anne de Bellevue. The teachers-in-training receive special instruction in gardening and nature study and have a large part of their observation and practice teaching in village and country schools.

In Nova Scotia the provincial Normal School at Truro is affiliated with the Agricultural College and every student receives instruction in science subjects at the hands of the college staff. Besides this training in the normal term, a fourteen months' course is given leading to a Rural Science Diploma. It consists of a six weeks' summer term with a subsequent three months' spring term or as an alternative four summer terms of six weeks each. The instruction in the College is supplemented by home reading and investigation prescribed by the teachers.

In the State of Wisconsin there are sixteen authorized county training schools for teachers. The State makes a grant up to the amount of $2,500.00 for the maintenance of each. These schools keep in close touch with the needs of the rural schools by using adjacent rural schools for practice and observation, and according to Mr. P. Cary, State Superintendent of Education, "The schools have proved very satisfactory and are solving the problem of the trained teacher supply for rural schools of one department." The course of instruction is completed by the average student in two years. A similar plan is followed in the State of Michigan.

In the State of Oklahoma, recent legislation has made instruction in Agriculture in the public schools compulsory and teachers are required to qualify for the work. To meet this requirement the State Agricultural College has organized a "Correspondence Course" covering two years of nine months each. Texts are prescribed, "pointer questions" are sent to be answered, and the answer papers examined. The weakness in the scheme seems to lie in the lack of practical or experimental work.

In New Zealand teachers and high school pupils of the second and third years, wishing to qualify in the subject are required to undergo a departmental written examination. Before doing so, however, a certificate must be presented showing an approved course of instruction in practical agriculture. This practice work includes the operations of school gardening, experiments with plants and soils, etc. Moreover, as reported by Dr. Hogben, Director-General of Education, "Elementary practical agriculture is a subject of instruction recognized for the purpose of grants for manual and technical instruction in primary and secondary schools. The courses to be approved should include practical instruction in school gardens, and other practical work. The grants made are 2s. 6d. per head, per annum; but a grant of 10s. per head up to £7 10s. is made in the first year. *The number of these classes is rapidly increasing.*" New Zealand is evidently reaching a general adoption of the work faster than any state or province in America. But they have a permanency in the teaching profession not approached here. The lowest salary paid in any school to any teacher is not less than $800 and a large proportion of the teachers are men. Moreover, the schools are, as a rule, provided with a master's residence.

At the Training College for state teachers in Melbourne, Australia, there is a special department of Nature Study. The work done here is chiefly along the lines of practical elementary agriculture. Teachers from South Australia and Western Australia, as well as Victoria, are in training at this somewhat federal training school. Evidently the work is favorably considered, as a writer in a recent "Education Gazette" claims, "Australia is giving a lead to all other countries in this important branch of popular knowledge." Possibly, the opinion is insular. But at any rate all over the world a movement to give teachers special training in elementary agriculture, is in operation.

TRAINING OF TEACHERS IN ELEMENTARY AGRICULTURE.

In recent years the fact has been recognized that the teaching of agriculture in our public schools cannot be accomplished satisfactorily through any text book scheme, no matter how good the book, even if the subject is made obligatory. The success of the work must, in the final analysis, depend on the enthusiasm and preparedness of the teachers. In Ontario our teachers are not prepared; they cannot be enthusiastic. At the present time, the subject seems to stand discredited in the public mind. The opinion is held that the teachers, being trained in studies foreign to farm concerns, are an impractical body of servants, and that consequently, our children's training in agriculture should best proceed through the time-honored home-training method.

The fact is that the incorporation of this study in our schools' curriculum has passed through the text-book phase. And moreover, that with properly qualified teachers, the school can instruct in elementary principles underlying the practice of agriculture that are quite unknown or faintly recognized by father or mother. As with the natural sciences introduced into our high schools it was realized there must be practical laboratory work if proper educational aims were to be accomplished, so now it is felt that agriculture in the public schools must be taught through the growing of plants and the handling of soils in school gardens or in home plots.

This is the present attitude of our Education Department in the matter. It has been given practical application in the offer of special money grants to school boards to enable them to buy land and build toolhouses, and to teachers to encourage them to qualify for the work and carry it on. The allowance to teachers is thirty dollars a year. To receive this it is necessary for them to acquire a certificate of qualification from the Macdonald Institute and teach the work to the satisfaction of the inspector.

At your request I drew up an outline of study to cover this required qualification. It is practically the course that has been developed for our three months' Nature Study classes, during the past three years. It is now stated specifically so that each department of the College may realize its share in the plan and recognize it as one of the accepted College courses. While it may seem to be too comprehensive, it is to be considered as suggestive rather than obligatory. It is felt that the trained minds of teachers who might attend, can readily grasp the relative significance of Dairy Husbandry, Animal Husbandry, etc., while making their special study in Horticulture, School Gardening, etc. They should be sent away from us with a broad view of the meaning and scope of Agriculture.

In case that it is found that teachers can not get leave of absence for a spring term nor afford to meet the expense of the course, other arrangements will have to be made for summer sessions or correspondence courses. The proposed course and its accompanying regulation follows:

PROPOSED COURSE IN ELEMENTARY AGRICULTURE FOR TEACHERS.

Object of Course.

(1) To prepare teachers for meeting the requirements of the Education Department in regard to the teaching of elementary agriculture and horticulture through school gardens.

(2) To train rural teachers for rural schools by awakening interest and thought in the scientific principles and practices of modern farming so that the country and village schools may sympathize and direct in the life-interests of country boys and girls.

Nature of the Course:

The whole College equipment of garden and orchard, farm and experimental plots, stables and workshops, museums and campus, green houses and laboratories, forest nurseries and experimental bush, dairy and poultry farms will be at the service of students for observation and use.

The instruction will be given in lecture room, laboratory, workshop, garden, and field; the theory and demonstration of the lecture and laboratory will exemplify the out-of-door practice; it will be elementary in character, the pupil in the rural school being kept in view always.

Requirements for Admission:

The course is open to all teachers. Intending students are advised to prepare for the term's work by reviewing their science studies taken in high or normal school.

Applications:

Candidates should address applications to the President of the College.

Examinations:

Written and practical examinations will be held at the end of the term testing the candidate in the subjects prescribed. The term work as represented by garden practice, individual experiments, laboratory work, collections and written records will be largely considered in awarding a certificate.

Certificate:

The certificate will be known as a "Certificate in Rural Science."

Subjects:

Instruction will be given in Physics, Chemistry, Entomology, Bacteriology, Horticulture, Botany, Field Husbandry, Animal Husbandry, Poultry, Dairying, Gardening and Pedagogy; the following tentative time-table will suggest the allotment of time for each subject:—

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
8.30–10.15	Physics	Entomology	Physics	Bacteriology Animal Husbandry	Pedagogy	Gardening
10.15-12.00	Botany	Chemistry	Botany	Field Husbandry	Poultry Dairying	Individual Work
1.30–3.30	Manual Training Farm Carpentry	Horticulture	Botany Forestry	Horticulture	Gardening	

Exemptions from Attendance:

(1) Teachers who have previously completed satisfactory three months' course in Nature Study will be awarded the certificate on passing the regular examination at the end of the term. and presenting the necessary plant, seed, weed, and insect collections; or the certificate will be awarded to such teachers as are successfully carrying on school garden work in their schools as attested by the Public School Inspector or College representative. This will be taken to mean that there are individual and experimental plots, forest nursery beds, etc., in the garden and properly co-related instruction in the school.

(2) Teachers who have completed satisfactory courses in High School Agricultural Departments (taking the garden work and making collections) as attested by certificate from the Principal will be granted the certificate on showing satisfactory evidence of carrying on garden work as above.

(3) Teachers who hold the Associate Diploma from the College will be granted the certificate on showing satisfactory evidence that they are carrying on garden work as above.

Partial Extra-Mural Course:

While it is felt that a three months' attendance at the College is highly desirable for gaining a proper insight into the nature of the work, it is realized that many teachers desirous of equipping themselves in this branch of school work may not be in a position to take advantage of the above course. To such teachers the following course might be offered:—

(1) To attend a July session as a preliminary preparation for the work.

(2) To follow a winter course of reading as specified under each subject prescribed below under direction and supervision from the College.

(3) To commence a school garden in the spring in which there are individual plots, flower borders, experimental plots with at least two of the Experimental Union experiments.

(4) To get plant, weed-seed and insect collections under way.

(5) To attend a second July session and take the examination at its close.

Teachers who have previously taken summer courses will find this option suit their needs. Such teachers will be exempt from work previously covered and will put their time on special studies; they will take the final examination, however.

This plan would enable teachers to gain their certificates within thirteen months and receive the bonus grant of thirty dollars for their first year's garden.

Course of Study.

School-Gardening: (Each student will have a garden for practice and observation).

History of its development abroad and in Canada; its aims as a school study; exhibitions; laying out of a garden; individual plots; class plots; teacher's plots; experimental plots; forestry plots; borders; keeping of tools; home gardens; keeping of garden records; observation in gardens at Marden School and Macdonald Consolidated School.

Texts and Reading:

Nature Study and Life—Hodge.
The Outlook to Nature—Bailey.
Among Country Schools—Kern.

BOTANY:

(1) Systematic:—Examination, description and classification of common economic plants of garden, field and forest with collection of 25 pressed mounts.

(2) Weeds:—Seed Control Act; study and identification of the seeds of 25 common weeds with collection of same.

(3) Plant Diseases:—Study and identification of common fruit, vegetable and grain diseases; laws regarding Barberry, Black Knot, etc.; application of preventatives and remedies. Collection.

(4) Physiological:—Experimental and observation work:—

The Seed: Testing the vitality; determining the condition necessary for germination, how the seedling becomes established.

The Root: How roots grow, their function; how they absorb food and water; proof of their using air and giving out carbon dioxide; quantity of water absorbed.

The Leaf: The function of leaves; control and measure of transpiration; respiration; starch-formation; behavior in light and darkness.

The Stem and Buds: Forms, structures and functions of stem and buds; influence of temperature, moisture, light on growth; how the sap circulates.

The Flower and Fruit: The functions of the parts of flowers; causes controlling the opening and closing of flowers; pollination; formation of fruits; devices for protecting and dissemination of seeds; cross fertilization; plant breeding on experimental plots.

In the physiological experiments individual students will be assigned special subjects which they will demonstrate to their classmates after completing them.

Texts and Reading:

Spotton's Botany (new edition).
College Bulletin on Weeds.
The Farm Weeds of Canada—published by Dominion Government.
Experiments with Plants—Osterhout.
Botany—An Elementary Text Book—Bailey.

HORTICULTURE:

(1) Development, importance, needs and outlook for the fruit industry; governmental interest and action regarding shipping, marking, cold-storage, fumigation of nursery stock; experimental stations, co-operative tests in Experimental Union.

(2) The principles of gardening of vegetables, flowers and fruit.

Practical and Observational:

Preparation and care of land; hot beds and cold frames; fertilizers and compost heaps; cultivation of annuals, perennials, and bulbs; artificial reproduction by cutting, budding, grafting, layering; the care of fruit trees and orchards, pruning, cover-crops, etc.

Texts and Reading:

The Nursery Book—Bailey.
Principles of Fruit-growing—Bailey.
Fruits of Ontario—Ontario Department of Agriculture.
Vegetable Gardening—Green.
Home Floriculture—Rexford.

FORESTRY:

Development of forestry work in other countries; value of lumbering industry; Canada's conditions and needs; laws and regulations regarding re-forestation and forest-preservation; the establishment, care and protection of wood lots.

Practical and Observational:

Identification of our Forest trees; planting seed-beds in school gardens; work in College nursery, and in the experimental bush; collections of weeds, etc.

Texts and Reading:

A First Book of Forestry—Roth; Ginn & Co.
Bulletin No. 24, Forest Service, U. S. Department of Agriculture.
Sylvan Ontario—Muldrew; Briggs, Toronto.

FIELD HUSBANDRY:

Importance of field crops in the national economy; systems of farming; rotation of crops; fertility of the soil; cultivation of the land; classes of farm crops; uses of farm crops; varieties of farm crops; selection of plants; selection of seeds; structure of seeds; improvement of crops by means of selection and hybridization; practical tests in connection with Experimental Union; study of work being done in experiments with farm crops in Canada and in the United States.

Practical and Observational:

Examination of field crops on neighboring farms; the work on the experimental plots; farm crops in the school garden; the agricultural museum; laboratory study of the root development of farm crops; types of seeds of grains, grasses, clovers, roots and fodder crops; germination of seed.

Texts and Reading:

Reports and bulletins on field crops of the Agricultural College; Cereals of America, Hunt; Forage Crops, Voorhees; The Story of the Plants, Grant Allen.

BACTERIOLOGY: (Lectures and Laboratory Work.)

Lectures, demonstrations and laboratory work, exemplifying the work of bacteria in soil, dairying, plant and animal diseases; Government regulation regarding tuberculin tests, killing of diseased cattle, stamping out of hog cholera, meat inspection, etc. An experiment on soil inoculation in the school garden.

Texts and Reading:

Agricultural Bacteriology—Conn.
The Story of Germ Life—Conn.

PHYSICS: (Lectures and Laboratory Work):—

Physical nature of soils, soil moisture, heat and air; principles of tillage and systems of drainage and cultivation; measurements of fields with the chain; identification of samples of soils; principles of common farm machines; meteorological records.

Collection:—Typical soils in vials.

Texts and Reading:

The Soil—King.
Engineering for Land Drainage—Elliott.
Surveying—Baker & Dickson.
Meteorology—Davis.

CHEMISTRY: (Lectures and Laboratory Work):—

(It is assumed that students will have a knowledge of elementary chemistry.)

Agricultural chemistry; plant growth and composition; soils; manures and fertilizers; insecticides and fungicides.

Texts and Reading:

Chemistry of the Farm—Warrington (first five chapters).
Fertilizers—Voorhees.
Plant Life—Masters.

ENTOMOLOGY:

Losses through insects in agriculture and horticulture; governmental interest; classification of insects and laboratory study of types; common, beneficial, and noxious insects; out-door study and collecting in field, garden, orchard and forest; insecticides; a collection of properly mounted and labelled specimens is required.

Texts and Reading:

Chittenden's "Insects Injurious to Vegetables"—Orange Judd Company, New York.
Needham's "Outdoor Studies"—American Book Co., N.Y.
College Bulletins 150, 158.
Reports of Entomological Society.

ANIMAL HUSBANDRY:

Development, importance, status of the industry in Ontario; histories and characteristics of principal breeds of live stock; types; stabling and care.

Practical and Observational:

The College stables and herds; judging with score cards.

Texts and Reading:

Types and Breeds of Farm Animals—Plumb.
Principles of Breeding—Davenport.
Judging Live Stock—Craig.

DAIRY HUSBANDRY:

Development, importance, needs, outlook, governmental interest and action; markets and competition; dairy breeds; caring and stabling; individual cow-testing; care of milk and cream.

Practical and Observational:

Process of Cheddar cheese making, curing, boxing, labelling, shipping. Process of buttermaking, printing, shipping, milk-testing with lactometer and Babcock test; milk separation with hand separator.

Texts and Reading:

Annual Reports Dairymen's Association of Ontario.
The Elements of Dairying—J. W. Deeker.
Cheese-making—J. W. Deeker.
Testing Milk and its Products—Farrington & Woll.
Canadian Dairying—Dean.
Modern Methods of Milk Testing—Van Slyke.

POULTRY:

Development and importance of poultry industry in Canada; markets and competition; governmental interest and action; common breeds; feeding, housing; incubation; individual testing by trap nest; preservation of eggs.

Practical and Observational:

Natural and artificial hatching of chicks; care of young in brooders, feeding, etc.

Texts and Reading:

First Lessons in Poultry Keeping—Poultry Pub. Co., Boston.

MANUAL TRAINING (Farm Carpentry):

Making insect box, garden stakes, plant-press, dibbles, germination boxes, ladders for fruit picking; trap nests; line-reels; cutting glass; puttying for hot beds; painting; mixing of paints; care of brushes; sharpening hoes; inserting handles in spades; care of tools; sharpening knife and saws; making knots and splices.

Texts and Reading:

Woodworking for Beginners—Chas G. Wheeler.
Benchwork—W. F. M. Goss.
Every Man's Own Mechanic—Spon.

AGRICULTURAL HIGH SCHOOLS.

The solution of the problem of introducing agriculture into the rural schools will be partially solved by the introduction of the subject into high school courses. In this regard, Ontario is at a critical period. It is to be hoped that from the experiment in the high schools at Essex, Galt, Collingwood, Lindsay, Morrisburg, and Perth, a widespread interest in agricultural teaching in our secondary schools may result.

While secondary schools of agriculture have been in operation for many years in Great Britain, Germany, France, Japan and other foreign countries, it is only in recent years that they have been known in America. There are two in the State of Wisconsin, one in Minnesota, and others are projected in other States. There appear to be two general plans of organization developing. In some cases the schools are to be established as distinct secondary technical schools. In other cases, the establishment is to be along the lines followed in our Province: that is, to make them a part of the regular high school.

That the adoption of these schools in the State Schools system is being taken up enthusiastically is shown by the history of the movement in the State of Georgia. In 1906 an Act was passed in the General Assembly authorizing the establishment of a District Agricultural High School in each Congressional district as a branch of the State College of Agriculture. Provision for maintenance was made by setting apart fees arising from the inspection of fertilizers, oils, etc. Bids in land and money grants were called for from each district, and for the eleven schools the total value of the bids was nearly $850,000 and the rejected bids amounted to fully as much. Thus the establishment has been made a local affair and insures a direct interest in their support. In no case was less than 240 acres of land donated and the money bonuses were as high as $60,000.

These Georgia schools will be organized somewhat after the plan of our College. The course is one of four years, and students will be given practical work about the farm and in the workshops as well as classroom and laboratory instruction. They may be paid for this service, thus reducing the cost of their courses. Some students will remain during the summer to help carry on the farm work. Provision is being made, too, for courses in home sciences and arts for girls. While agriculture is the specially emphasized subject in the school work, a good general English education is provided for.

Generally speaking, however, agriculture in the secondary schools in the United States, is being introduced as in Ontario. It is being established as an additional branch of work in the ordinary high school. At St. Louis, Michigan, high school, the class in agriculture is the largest class in the school. In Missouri, the State superintendents report that agriculture is taught in two hundred of the high schools; in Ohio there are thirty high schools taking the work; in more than twenty other States there are one or more high schools giving instruction in agriculture.

S. B. McCREADY.

PART XX.

THE LIBRARIAN.

To the President of the Ontario Agriculture College:

SIR,—I have the honor to submit herewith the report of the library for the year 1907.

During the past year 1,016 books have been added to the library, 192 of which have been magazines, reports and bulletins that were bound, and the remainder are classified as follows:

Agriculture	73	Bacteriology	19
Horticulture	38	Entomology	9
Forestry	16	Ornithology	5
Veterinary Science	12	Geology	16
Dairying	4	Physics and Meteorology	18
Poultry	3	Chemistry	20
Zoology	13	General Science	20
Botany	48	Agricultural reports	31

Horticultural reports	6	History	27
General Science reports	19	Biography	17
Domestic Science	22	Description and Travel	12
Hygiene	16	Ethics and Religion	4
Education	22	Fiction	4
Nature Study	4	Literature	117
Manual Training and Drawing	22	Reference books	17
Useful Arts	26	General reports	11
Economics	42		

The following reference sets have also been added:

Bailey, L. H.—Cyclopædia of American Agriculture, v. 1 and 2.
Bailey, L. H.—Cyclopædia of America Horticulture.
Bible Encyclopædia.
Cambridge Modern History.
Cyclopædia of Drawing.
Cyclopædia of Modern Shop Practice.
Modern Encyclopædia.
Ridpath Library of Universal Knowledge.
Tennant, J. A. (editor)—Photo Miniature, 15 v.
U.S. 12th Census and Statistical Atlas.

We wish to express our appreciation of all our exchanges, especially of the United States Department of Agriculture, the Experiment Stations of America, Australia, Cape Colony, Japan, India, South America and Europe; and our gratitude for the following gifts:

From Rev. Dr. J. C. S. Bethune:
The Works of the English Poets.
Bohn's Standard Library, 6 v.
From the Co-operative Wholesale Society, Montreal.
Eight volumes of their Annual.
From Mr. G. C. Cunningham, O.A.C.:
The Papers and Minutes of the Colonial Conference, 1907.

On the resignation of Miss Alice Rowsome as librarian, I succeeded to the position October 8, 1907. Our plans for the coming year include reclassifying of the books of the library in so far as is necessary to make the subjects more clearly allied; and arranging them alphabetically in those classes. This will bring together the different copies of the same work, and also the various books by one author on the same subject, so that it will be easier to find the particular books wanted. We shall also make reference lists of the material in the library on subjects called for by the various classes and debating societies which cannot readily be collected from the catalogue and magazine indexes.

Arrangements have been made with the Macmillan Co., of Toronto, by which they will send on approval such books as they wish to recommend to our notice. This will enable the heads of the Departments to see, soon after they are published, many of the new books on their subjects, and to know the more readily what to recommend for the library.

I wish also to speak with appreciation of the excellent way in which the assistant librarian, Miss Margaret Frew, carried on the work of the library after Miss Rowsome's departure, and the helpful way in which she assisted me in beginning my work.

I have the honor to be, Sir,

Your obedient servant.

EDITH C. DWIGHT.

PART XXI.

THE PHYSICIAN.

To the President of the Ontario Agricultural College:

Sir,—I have the honor of again presenting to you my annual report.

Last winter much sickness prevailed over this part of Ontario. The College had its full share of the ailments with which the community in general suffered. There were many cases of "sore throats," influenza, bronchitis, and the usual number of minor accidents. In addition, the College suffered from an outbreak of measles among both sexes. In all, eighteen cases occurred. The disease was brought in by a young man who evidently received the infection while away on his Christmas vacation and after his return was taken ill about the middle of January. Though many of these patients were quite ill, no serious complications occurred. During the months of March and April three students were obliged to enter the hospitals of the city for treatment. One of these suffered from an acute attack of appendicitis, for which he underwent operation and made a satisfactory recovery.

Thus far this autumn this part of the Province has been remarkably well, and I am glad to be able to report the same of the College. A case of appendicitis occurred in a young lady in Macdonald Hall. Otherwise, no serious illness has occurred up to the present. I have been obliged, however, to advise hospital treatment in three instances,—in one of the maids and two of the students. The latter were suffering from ailments which required operative treatment.

The attendance at the College this year has reached a new high record and many have been obliged to find accommodation outside the institution. To provide for this increasing attendance you have added to the dormitory twenty excellent new rooms, which, after reserving two for hospital purposes, as at present, will accommodate thirty-seven students, and you have enlarged the dining-room to meet the needs of the College in that respect.

I cannot close without referring to the large, suitably furnished sitting-room which this year has been provided for the students and which cannot fail to add to the comfort and enjoyment of their College life.

Respectfully submitted,

W. O. STEWART.

Guelph, Ont., Nov. 27, 1907.

INDEX.

Acidity of curd at Salting, 129.
Agricultural High Schools, 275.
Agriculture in High Schools, 11.
Alfalfa, 220.
Alternaria Blight of Ginseng, 49.
Analysis of College Roll, 12.
Animal Husbandry (Report), 155.
Apple Blossoms, self-sterility, 141.
Applied Mechanics (Report), 256.
Ash constituents of crops, 81, 85, 88.
Asparagus Beetle, 57.
Associate Diploma Recipients, 13.

Bachelors of the Science of Agriculture, 13.
Bacteriology (Report), 131.
Barley, 171, 173, 174, 175, 177, 182, 184, 188.
Beans, 143, 198, 240.
Beet pulp, 81.
Beets, 143, 203.
Bethune, C. J. S. (Report), 52.
Binder, a new, 262.
Bindweed, 42.
Bladder Campion, 42.
Blighting of Oats, 49.
Botany, (Report), 41.
Boutsje Q. Pietertje, De Kol, milk record, 100, 162.
Breakfast Foods, 77.
Buckwheat, 196.
Buildings erected during 1907, 11.
Bursar (Report), 15.
Butter, experiments, 70, 104, 115.

Cabbage, 134, 143, 217, 242.
Cæsar, L., investigation work, 54, 56.
Carrots, 143, 207.
Cat's Foot, 44.
Celery, 144.
Charlock, 42.
Chemistry (Reports), 64, 81.
Cheesemaking, experiments, 120, 125, 129
Chickens, 234, 235.
Civic Improvement, 154.
Clover, 219, 224.
Codling Worm or Moth, 57.
Commercial Feed Stuffs, 92.
Condimental Foods, 89.
Cooking experiments, 240.
Co-operative planting, 230.
Corn, 195, 209.
Cottony Maple Scale, 53.
Couch Grass, 42.
Cover Crops, 138.
Cow Bell, 42.
Cow Cockle, 45.
Cow Grass, 43.
Cow Peas, 199.
Creelman, G. C., (Report), 7.
Crown Gall, 48.
Cucumbers, 146.
Curd cutting, 123, 125.
Cutworms, 54.
Dairy Herd, 162.
Dairy Husbandry (Report), 97.
Day, G. E., (Report), 155.
Day, W. H., (Report), 24.
Dean, H. H., (Report), 97.
Dean of Residence (Report), 21.
Domestic Science, short course, 247.
Drainage, 27, 29.
Dwight, Edith C., (Report), 276.

Economics (Report), 237.
Edwards, S. F., (Report), 131.
Elementary Agriculture, 265.
Emmer, 169, 174, 177, 184.
English (Report), 22.
Entomological Society, 63.
Entomology (Report), 52.
Eructa Sativa, 45.
Evans, John, (Report), 256.
Excursions, 9.
Experimental Union, 9, 175.

Fall Fairs, College Exhibits, 60.
Farm Crops in Ontario, 172.
Farm Superintendent, 155.
Fat Mixed into Dough, 244.
Feed Stuffs, commercial, 92.
Fertilizers, 68, 82.
Field Husbandry and Experiments (Report), 165.
Financial Statement, 15.
Flax, 174, 184, 196.
Floriculture, 148.
Flour production of wheat, 192.
Flour testing, 72, 80.
Flower Beds and Borders, 152.
Forcing House experiments, 145.
Forestry (Report), 227.
Fruit Growing, 137.
Fungicides, 56.
Fungous Diseases, 48.

Gamble, W. P., (Report), 81.
Geology (Report), 81.
Ginseng, 49.
Graduating Class, 10.
Graham, Robt. R., (Report), 21.
Graham, W. R., (Report), 233.
Grass Peas, 174, 184, 199.
Grass mixture, 169, 224.

Harcourt, R., (Report), 64.
Herbarium, 49.
Home Economics, 8.
Home Economics (Report), 239.
Homemaker Course, 246.
Horticulture (Report), 135.
Housekeeper Course, 245.
Hutt, H. L., (Report), 135.
Hydrocyanic acid gas, 58.

Incubation of eggs, chemistry of, 77.
Injurious Insects, 53.
Insectary, 62.
Insecticides, 56, 57, 58.

Kale, 217.
Kitchen Equipment for Class Work, 250.
Kohl Rabi, 207.

Landscape Gardening and Rural Art, 153.
LeDrew, H. H., (Report), 237.
Leguminous crops for green fodder, 219.
Lettuce, 146.
Librarian (Report), 276.
Lice on Plants, 53.
Lightning, damage by, 26.
Lime and Sulphur wash, 56, 80.
Live Stock, 161.
Lodged grain, 80.
Lucerne, 220.

McCready, S. B., (Reports), 41, 264.
Macdonald Institute, 16, 148, 238, 255, 263.
Macaroni wheat, 193.
Mangels, 202.
Milk record, 100, 161.
Millet, 197, 214.
Milling department, 72, 80.
Moisture in Butter, 70, 100, 108.
Moisture in Cheese, 125.
Mustard, 42, 55.

Nature Study (Report), 264.
Normal Courses, 239, 262.
Nurseries, 228.

Oats, 173, 174, 175, 177, 182, 184, 185.
Oat Blight, 49.
Onions, 144, 242.
Orchard fruits, 138.
Oyster Shell back-louse, 53, 58.

Parsley, 146.
Parsnips, 208.
Pasture Crops, annual, 222.
Pastures, grasses and clovers mixed, 224.
Pasteurization of Milk for cheesemaking, 120.
Pear Leaf Scald, 48.
Peas, 144, 173, 174, 177, 184, 197.
Penny Grass, 42.
Pepper Grass, 43.
Perennial Sow Thistle, 42.
Permanent Pasture Grasses, 224.
Physician (Report), 278.
Physics (Report), 24.
Plant breeding, 137.
Plant Lice, 53.
Polish Wheat, 194.
Potatoes, 76, 171, 175, 200.
Poultry (Report), 233.
Poultry Houses, 233.
Power on the Farm, 258.
President (Report), 7.

Radishes, 146.
Ragwort, 45, 46.
Rape, 217.
Reed, J. H., (Report), 95.
Religions of Students, 13.
Reynolds, J. B., (Report), 22.
Rose Beetle, 53.
Rye, 173, 174, 184, 194.

San Jose Scale, 53.
Sanders, G. E., experiments, 141.
Salt Affecting Moisture in Butter, 108.
Scholarships, etc., 14.
School Grounds and Gardens, 153, 266.
Scurfy Bark-louse, 53.
Seeding, different dates of, 177.
Seeding, quantity per acre, 178.
Seed mixtures for grain production, 181.
Sewing, short course, 247.
Sheep's Fescue, 44.
Short courses, 8.
Silo, 209.
Smut, treatment of grain for, 179, 188.
Sorghum, 197, 212.
Soy Beans, 198.
Spelt, 169, 177.
Springer, S., (Report), 15.
Staff Changes, 7.
Steers, fattening for export, 157, 160.
Stewart, W. O., (Report), 278.
Stinking Goosefoot, 46.
Stink Weed, 42.
Stock Foods, 89.
Stock Judging at Chicago, 9.
Straw, strength of, 187.
Student-labor, 16, 248.
Students of the year, 12.
Sub-irrigation, 147.
Sugar Beets, 68, 81, 204.
Sunflowers, 197, 214.
Sun Spurge, 45.
Surface watering, 147.
Swine, 155.

Teachers' Conventions, 267.
Teacher Training, 269, 270.
Testing Cows, officially, 98.
Testing Cows and Milk, 98, 99.
Timothy, 221.
Tomatoes, 69, 144, 146, 147.
Trap Nests for Poultry, 234.
Tree planting, co-operative, 230.
Turnips, 207.
Twitch Grass, 42.

Vegetable Cooking, 242.
Vegetable Gardening, 143.
Vetches, 174, 184, 199.
Veterinary Science (Report), 95.

Water analysis, 68.
Water Cress, 146.
Waste lands, reclaiming by forestry, 232.
Watson, Mary Urie, (Report), 239.
Weather report, 24, 170.
Weeds, 42, 61.
Weed seeds from Western Provinces, 46.
Wheat, 169. 173. 174, 175. 176, 177, 178, 179, 184, 190, 192, 193, 210.
White Fly, fumigation for, 150.
Women's Institutes, 9.
Wood lots, 227.

Yellow Rocket or Cress, 44.

Zavitz, C. A., (Report), 165.
Zavitz, E. J., (Report), 227.
Zoology (Report), 52.

Twenty-ninth Annual Report

of the

Ontario Agricultural and Experimental Union

1907

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1908

WARWICK BRO'S & RUTTER, Limited, Printers,
TORONTO.

To the Honourable SIR WILLIAM MORTIMER CLARK, K.C.,
Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the pleasure to present herewith for the consideration of your Honour the Report of the Agricultural and Experimental Union for 1907.

Respectfully submitted,

NELSON MONTEITH,

Minister of Agriculture.

Toronto, 1908.

CONTENTS.

PAGE

Union Members........ 5
Officers for 1907-8........ 8
Treasurer's Report: H. L. Hutt........ 8
Secretary's Report: C. A. Zavitz........ 9
President's Address: J. M. McCallum........ 10
Co-operative Experiments in Agriculture: C. A. Zavitz........ 14
What We Expect from the Graduates of the Agricultural College: Hon. Nelson Monteith 33
Co-operative Experiments with Vegetables and in Fruit Growing: H. L. Hutt........ 34
Naming the Farm: G. C. Creelman........ 47
Co-Operative Experiments with Fertilizers in Swamp Soils: R. Harcourt........ 48
Farming with a Definite Object in View: G. A. Putnam........ 51
Report on Farm Forestry in Ontario: E. J. Zavitz........ 53
Co-operative Experiments in Agriculture: R. F. Holtermann........ 56
Legislative Control of Feeding Stuffs: W. P. Gamble........ 57
The Future Development of the Field Crop Competition in Ontario: T. G. Raynor..... 62
Competitions with Field Crops: J. Lockie Wilson........ 65
Progress of the O. A. C. during 1907: G. C. Creelman........ 66
Address: Hon. Nelson Monteith........ 68
Address: President R. A. Falconer........ 71
Presentation to Prof. G. E. Day........ 73
Agricultural Instruction: C. C. James........ 75
    Report for Lanark County: R. S. Hamer........ 78
    Report for Waterloo County: F. C. Hart........ 81
    Report for Essex County: A. McKenney........ 82
    Report for Simcoe County: R. E. Mortimer........ 85
    Report for Dundas County: W. A. Munro........ 87
    Report for Victoria County: F. H. Reed........ 89
The Department of Agriculture and Agricultural Courses in High Schools: C. C. James.. 92
    Course in Agriculture: S. B. McCready........ 95

MEMBERS FOR 1908.

The following list of members includes all of those who are or have been connected with the Agricultural College, and have paid the annual membership fee for the present year. It is quite distinct from the list of co-operative experimenters, of whom there are now over 5,000.

Aldwinckle, E. W., O.A.C., Guelph.
Allan, F. W., Churchill.
Allen, R. J., Guelph.
Andrew, D. A., Lucknow.
Angle, P. E., Fork's Roard.
Arkell, H. S., Macdonald College, Que.
Arkell, T. R., Arkell.
Arnold, J. H., Easton's Corners.
Augustine, H. W., Burnaby.
Austin, H. S., Lynn Valley.
Austin, R., Tottenham.

Bailey, C. F., Coldbrook, N.S.
Baker, A. C., Harding Hall, London.
Barlow, B., O.A.C., Guelph.
Beaupre, F. C., Simcoe.
Bedal, E., Bright.
Bell, D. T., Glanford Sta.
Bengough, W. L., O.A.C., Guelph.
Bethune, Dr., O.A.C., Guelph.
Birdsall, F. E., Birdsall.
Bowes, L. A., Strathnairn.
Bowland, B., Carleton Place.
Bradt, E., York.
Bray, C. I., Agricultural College, Miss.
Bray, R. N., Nashville.
Breckon, W. D., Waterdown.
Brodie, G. A., Bethesda.
Brokovski, C. J., Battleford, Sask.
Brown, S. P., Coldstream.
Brush, G. H. R., Owatonna, Minn.
Buchanan, C. W., Florence.
Buchanan, D., Florence.
Buchanan, J., O.A.C., Guelph.
Burns, J. H., St. Marys.
Butler, G. C., Hatfield, Peveril, Eng.

Caesar, L., Mono Roard.
Cameron, G., Ivan.
Campbell, A. D., Strathroy.
Campbell, J. A., Simcoe.
Campbell, M., Komoka.
Campbell, M., Zimmerman.
Canby, F., Burnaby.
Carleton, J. A., Avening.
Carlaw, Geo., Warkworth.
Carpenter, G. H., Toronto.
Carroll, J. A., Middlemiss.
Channon, G. C., Oakwood.
Chessor, W., O.A.C., Guelph.
Clark, A., O.A.C., Guelph.
Clark, G. H., Can. Bldg., Ottawa.
Clark, E. E., Meaford.
Clark, T. O., Calgary, Alta., (Box 1906).
Clement, F. M., Virgil, Ont.
Cleverley, H. S., Bay Owne, N. J.
Clowes, F. A., Toronto.
Coben, H., Kinmount.
Coglon, M. F., O.A.C., Guelph.
Coglon, R. B., Bath.
Cohoe, W. J., New Durham.
Coke, J., Erin.
Collins, G. W., O.A.C., Guelph.
Cooper, H. S., Toronto.
Cornell, J. G., Scarboro.
Cowie, A. J., Caledonia.
Crawford, E. A., O.A.C., Guelph.
Creelman, G. C., O.A.C., Guelph.
Crow, J. W., O.A.C, Guelph.
Culp, A., Vineland.
Culp, S. H., Vineland.
Cunningham, G.C., Oil Springs.
Cunningham, H. C., Ottawa.
Cutler, G. H., Birnam.

Daly, H., Holland Landing.
Day, G. E., O.A.C., Guelph.
Day, W., Powles' Corners.
Dean, H. H., O.A.C., Guelph.
DeCoriolis, E. G., Urbana, Ill.
Dempsey, P. C., Trenton.
Dennis, F. H., Ealing, London.
Dennis, J. R., Weston.
Devitt, I. I., Freeman.
Diaz, G., O.A.C., Guelph.
Douglas, D., O.A.C., Guelph.
Duff, H. C., Dobbinton.
Duke, E. W., Montreal, Que.
Duncan, G. D., Don.
Duncan, R. S., Huntsville.

Eastham, A., O.A.C., Guelph.
Eastham, J. W., O.A.C., Guelph.
Edwards, S. F., O.A.C., Guelph.
Edwards, W. E. J., Balsam.
Elton, C. W., Cowley, Alta.
Emigh, C., Holbrook.
Esmond, C. W., Winnipeg, Man.
Evans, J., O.A.C., Guelph.
Evens, J., Randolph.
Evens, N., Randolph.
Everest, G. W., O.A.C., Guelph.
Ewing, A. A., Englehart.

Fairbairn, J. B., O.A.C., Guelph.
Fairweather, F. H., Alma.
Farlinger, W. K., Morrisburg.
Faulds, T. B., Marmora.
Ferguson, C., Eversley.
Filson, H., Stella.
Fisher, P. A., Burlington.
Forsyth, F., Glasgow.
Foster, K. A., Abernethy, Sask.
Foster, N., Toronto.
Fraser, R., Galetta.
Freek, E. M., Barrie.
Frier, G. M., Shediac, N.B.
Fulmer, H. L., O.A.C., Guelph.

Gamble, W. P., O.A.C., Guelph.
Gandier, S. H., Lion's Head.

MEMBERS FOR 1908.—*Continued.*

Garrigus, H. L., Storrs Sta., Conn.
Gilmour, J. D., Doe Lake.
Goble, F. W., Woodstock.
Gordon, D., Elora.
Goulding, G. C., Vernon, B.C.
Graham, R. R., O.A.C., Guelph.
Graham, W. R., O.A.C., Guelph.
Grant, A., O.A.C., Guelph.
Grasser, F., Guelph.
Green, R. J., Agincourt.
Green, R. W., O.A.C., Guelph.
Groh, H., Preston.
Grub, I., Mildmay.
Gunn, R. E., Beaverton.

Haight, W. L., Conway.
Hall, T. L., Weisenburg.
Hamer, R. S., Perth.
Harcourt, J., St. Ann's.
Harcourt, R., O.A.C., Guelph.
Harkness, A. D., Irena.
Harley, L., Harley.
Harries, J. F., O.A.C., Guelph.
Harris, C. H., Rockwood.
Harris, G. S., Moresby Island, B.C.
Harris, R., Rockwood.
Hart, F. C., Galt.
Hart, S., Tweedside.
Hayes, J. A., Calgary, Alta.
Henderson, I. B., Hampden.
Herner, M. C., Mannheim.
Hibberd, G., New Windsor, Maryland.
High, A. M., Killarney, Man.
Hodgins, E. L., Portage du Forte, Que.
Hodson, R. W., Toronto.
Hoffman, C. W., Plattsville.
Holman, W., O.A.C., Guelph.
Holtermann, R. F., Brantford.
Hosmer, S. A., Batavia, N.Y.
Houser, H. W., Campden.
Howard, C. F., Hagersville.
Howell, S., Jerseyville.
Howes, A., Harriston.
Howes, E. A., Guelph.
Howitt, J. E., O.A.C., Guelph.
Humphrey, J., Scarboro.
Humphrey, R. J., Troy.
Hunt, W., O.A.C., Guelph.
Hutchinson, A., Mt. Forest.
Hutchison, J. R., Slate River Valley.
Hutt, H. L., O.A.C., Guelph.

Innes, R., Coldbrook, N. S.

Jackson, W. D., Fulton.
Jarvis, C. D., Storrs, Conn.
Jarvis, T. D., O.A.C., Guelph.
Jenkinson, R. H., Toronto.
Jewson, J. E., Stone Quarry.
Jones, D. H., O.A.C., Guelph.
Jones, J. W., Pownal, P.E.I.
Joubert, M. J., O.A.C., Guelph.
Jull, M. A., Burford.

Keegan, H. L., O.A.C., Guelph.
Kennedy, S., Apple Hill.
Kerr, W., Bronson.
Kewley, H. D., Sarnia.
Kidd, S. E., Burritt's Rapids.
King, J. H., Smith's Creek, N.B.
King, V., O.A.C., Guelph.
Kitchen, A. F., St. George.
Klinck, C. R., O.A.C., Guelph.
Knauss, H. L., Detroit, Mich.
Knight, A. A., Brackenrig.
Knopf, A. E., Montreal, Que.

Laird, J. O., Blenheim.
Lane, G., O.A.C., Guelph.
LaPierre, L. A., Paris.
Law, I. M., Solina.
Lawrence, C. A., Stratford.
Lawson, J. D., O.A.C., Guelph.
Learmouth, C. M., Galetta.
LeClair, J. M., St. Hyacinthe, Que.
LeDrew, H. H., O.A.C., Guelph.
Leitch, A., Deseronto.
LeLacheur, G., Murray Harbor, P.E.I.
Lennox, W. J., Newton Robinson.
Lewis, H. S., Vancouver, B.C.
Lewis, J. M., Knoxville, Ill.
Light, P. E., O.A.C., Guelph.
Linklater, W. A., Pulman, Wash.
Lloyd-Jones, J. G., O.A.C., Guelph.

McCallum, J. M., Shakespeare.
McCarthy, D. J., Kingston.
McConkey, N. H., Bayham.
McCready, S. B., O.A.C., Guelph.
McGrath, G. F., Easton's Corners.
McIntosh, A. D., Guelph.
McKenney, A., Essex.
McKenzie, A. G., Fairview.
McKenzie, D., Nutana, Sask.
McKenzie, D. A., Queen Hill.
McKenzie, N. D., Galt.
McKillican, C. G., Vankleek Hill.
McLaren, A., O.A.C., Guelph.
McLennan, A. H., Trafalgar.
McMeans, A., O.A.C., Guelph.
McRae, C. M., Ottawa.
McRae, D. E., Cumberland.
Maclennan, J. F., Bellows Falls, Vt.
Main, C., Sheffield.
Manton, G., Eglinton.
Marcelis, F. N., North Winchester.
Martin, D. H., Whitechurch.
Martin, L. R., Jordan Harbor.
Martindale, F. R., York.
Mason, A. W., O.A.C., Guelph.
Mason, T. H., Straffordville.
Metcalf, I. F., O.A.C., Guelph.
Middleton, M. S., Vernon, B.C.
Miller, T. E., Bridgeburg
Monk, B. F., Springford.
Monteith, Hon. N., Toronto.
Montizambert, T., St. Marys.
Moore, R. R., Norwich.
Moorehouse, R. L., Cairo.
More, J., Kirkton.
Morrison, G. F., Hartney, Man.
Mortimer, R. E., Collingwood.
Munro, W. A., Morrisburg.
Murray, J., Brandon, Man.
Murray, J. E., O.A.C., Guelph.

MEMBERS FOR 1908.—*Continued.*

Naismith, J., Stratford.
Newhall, H. W., Toledo, Ohio.
Newman, L. H., Ottawa.
Neville, S. J., Cottonwood, Sask.
Nicholson, C. S., Mount Forest.
Nixon, C. C., St. George.
Nunnick, C., Scotland.

Orser, O. R., Kepler.
Ostrom, H., Gothenburg, Sweden.
Owen, W. H., Hull, Eng.
Owen, W. C., Thornton.

Packard, R. C., Brockton, Mass.
Painter, A. J., Guelph.
Palmer, B. G., Norwich.
Palmer, C. L. S., O.A.C., Guelph.
Palmer, F., Victoria, B.C.
Palmer, W. E., Marshville.
Partridge, A. W., Crown Hill.
Patch, A. M. W., O.A.C., Guelph.
Peart, G. S., Freeman.
Peart, H. S., Jordan Harbor.
Presant, J. E., Guelph.
Putnam, G. A., Toronto.

Ralph, C. H., O.A.C., Guelph.
Raynor, T. G., Ottawa.
Reaman, G. S., Buttonville.
Reed, F. H., Lindsay.
Reeds, W. R., O.A.C., Guelph.
Reek, R. W., Romney.
Reid, P., Chateauguay Basin, Que.
Revell, H. K., Walkerville.
Reynolds, J. B., O.A.C., Guelph.
Rice, F. H., Essex Jct., Vermont.
Riley, J. J., Jr., Graham, Que.
Robertson, C. L., O.A.C., Guelph.
Robertson, M., St. Marys.
Robertson, G., Ottawa.
Robertson, G. A., St. Catharines.
Robinson, E., Guelph.
Rogers, D. C., Kingston.
Rose, D. M., O.A.C., Guelph.
Ross, W. A., O.A.C., Guelph.

Salkeld, D. G., Goderich.
Sanders, G. E., Urbana, Ill.
Schartow, C. H., Toledo, Ohio.
Schuyler, C., Brantford.
Schuyler, R., Jarvis.
Scott, W. R., Toronto.
Sheahan, T. A., Newark.
Shepherd, F., Bloomingdale.
Shibley, C. S., Harrowsmith.
Shortill, R. J. R., Ballinafad.
Shuh, C. H., Waterloo.
Sibbald, W. M., Sutton West.
Simard, J., Baie St. Paul, Que.
Sirrett, H., Rosseau.
Sirrett, R. W., Rosseau.
Slater, A. C., O.A.C., Guelph.
Sloan, R. R., Blyth.
Smith, M., Bickford.
Smith, W. H., Dutton.
Smye, G. C., Ayr.
Snyder, A. S., Blair.
Springer, S., O.A.C., Guelph.
Squirrell, W. J., O.A.C., Guelph.
Stark, J. H., Lang.
Stratton, R. W., O.A.C., Guelph.
Stewart, W. F., Strath Gartney, P.E.I.
Strong, W. J., O.A.C., Guelph.
Summerby, W. L., Russell.

Taylor, F., Cumberland Mills, Que.
Taylor, G., O.A.C., Guelph.
Taylor, S., Todmorden.
Templer, W., Jerseyville.
Thom, C. C., O.A.C., Guelph.
Thompson, Hugh, jr., Magnetawan.
Thompson, R. G., Boharm, Sask.
Todd, S. E., O.A.C., Guelph.
Toole, A. A., Mt. Albert.
Toole, W., Whitevale.
Treherne, R. C., O.A.C., Guelph.
Trethewey, J. E., Port Hammond, B C.
Tucker, H. S., Chapman.
Twigg, C. B., New Denver, B.C.

Waddell, W. M., Kerwood.
Wade, R. W., O.A.C., Guelph.
Walker, W., O.A.C., Guelph.
Ware, J. T., Allenburg.
Warren, F. B., Gamebridge.
Webster, H B., Science Hill.
Weekes, H. M., Glencoe.
Wells, E. A., Chilliwack, B.C.
Wenger, A. A., Ayton.
Westover, C. A., Frelighsburg, Que.
Westover, M., Frelighsburg, Que.
Weylie, D. B., Glanford, Sta.
Whale, J. B., Goldstone.
Wheaton, R. R., Thorndale.
Wheeler, H. C., Hubbard, O.
Whetham, C. A., Kirkwall.
White, E. F., Cincinnati, Ohio.
White, O. C., Ashburn.
Whiteside, A. E., O.A.C., Guelph.
Whyte, G. G., Tuxford, Sask.
Whyte, M. I., O.A.C., Guelph.
Wiancko, A. T., Lafayette, Indiana.
Wiancko, T. A., Sardis, B.C.
Widdifield, W. J., Uxbridge.
Wilkinson, P. J., Cambray.
Williams, A. L., Corbetton.
Williams, M. G., Islay, Alta.
Williams, W. E., Clandeboye.
Wilson, A. C., Aurora, Ill.
Wilson, E. E., Caledon.
Wilson, S., Rolling Dam, N.B.
Winslow, R. M., Chelsea Green, London.
Winter, M. H., Wicklow.
Wolverton, H. A., Nelson, B.C.
Wood, G. B., O.A.C., Guelph.
Woods, J. L., Stratford.
Wright, C. H., Agassiz, B.C.

Yamagucki, M., O.A.C., Guelph.
Yarwood, E. B., Picton.
Young, G., Waubuno.
Young, J. C., O.A.C., Guelph.

Zavitz, C. A., O.A.C., Guelph.
Zavitz, C. J., Forks Road.
Zavitz, E. J., O.A.C., Guelph.
Zavitz, H. V., Coldstream.

ONTARIO AGRICULTURAL AND EXPERIMENTAL UNION.

OFFICERS FOR 1907-1908.

President	G. A. Brodie, Bethesda, Ont.
Vice-President	J. O. Laird, Blenheim, Ont.
Secretary and Editor	C. A. Zavitz, Agricultural College, Guelph.
Assistant Secretary	J. Buchanan, Agricultural College, Guelph.
Treasurer	H. L. Hutt, Agricultural College, Guelph.
Directors	Hon. N. Monteith, G. C. Creelman, F. H. Reed, G. A Putnam, W. W. Ballantyne, M. Joubert.
Auditors	J. B. Fairbairn and W. J. Squirrell.

COMMITTEES ON EXPERIMENTAL WORK.

Agriculture	Prof. C. A. Zavitz, (Director), J. Buchanan, W. J. Squirrell, A. E. Whiteside.
Horticulture	Prof. H. L. Hutt, (Director), H. S. Peart, J. W. Crow.
Poultry	W. R. Graham, (Director), G. A. Robertson, W. A. Brown.
Forestry	E. J. Zavitz, (Director), R. D. Craig, E. C. Drury.
Chemistry	Prof. R. Harcourt, (Director), A. E. Shuttleworth, W. P. Gamble, Geo. McCalla.
Apiculture	R. F. Holtermann, (Director), E. M. Husband, C. C. Nixon.

TREASURER'S REPORT, 1907.

Receipts.

Balance from 1906	$ 729 48
Membership fees, 342 at 50c.	171 00
Government grant	2,500 00
Total	$3,400 48
Balance due Treasurer	104 35
	$3,504 83

Expenditure.

Agricultural experiments	$1,543 43
Horticultural experiments	1,735 75
Chemical experiments	50 00
Poultry experiments	5 25
Part expenses annual meeting 1906	71 40
Part expenses annual meeting 1907	99 00
Total	$3,504 83

We, the undersigned auditors, declare that we have examined the Treasurer's accounts and find them correct.

R. W. Hodson,
J. B. Fairbairn,
Auditors.

December 7th, 1907.

ONTARIO AGRICULTURAL AND EXPERIMENTAL UNION.

ANNUAL MEETING.

The twenty-ninth annual meeting of the Ontario Agricultural and Experimental Union was held at the Ontario Agricultural College, Guelph, on Monday, Tuesday, and Wednesday, December 9th, 10th, and 11th.

The President of the Union, Mr. J. M. McCallum, Shakespeare, Ont., presided over the regular sessions, and Mr. G. C. Creelman, President of the College, at the annual banquet on Tuesday evening.

SECRETARY'S REPORT.

Since the last annual meeting of the Experimental Union, three meetings of the board of control have been held, the Report for 1906 has been issued, some progress has been made in reference to securing a law to regulate the sale of feeding-stuffs, and a larger amount of co-operative experimental work has been conducted than in any previous year. I wish to express my gratitude to Mr. J. Buchanan, the Assistant Secretary, who did the Secretary's work entirely in 1906 during my absence, and who gave excellent help in the work of the past year.

In 1907, nearly 8,000 farmers, fruit-growers, gardeners, poultry-raisers and bee-keepers conducted co-operative experimental work at their own homes through the medium of the Experimental Union.

In Horticulture, the co-operative work of the past year was about twice as great as in 1906, four times as great as in 1905, and five times as great as in 1904. It now includes experiments with vegetables, as well as those with small and with large fruits. The total number of co-operative experimenters in Horticulture for the fourteen years, from 1894 to 1907, is 8,136.

In Agriculture, the co-operative work has been very extensive in its operations and influential in its results. The number of experimenters in 1907 reached over 4,000, and that for the twenty-two years, from 1886 to 1907, inclusive, 45,065.

The departments of Forestry, Bee-keeping, Poultry-raising, and Agricultural Chemistry have been doing good work, and the reports of the co-operative experimental work in these departments, as well as those in Agriculture and Horticulture, should prove both instructive and helpful.

The experimenters deserve great credit and sincere thanks for the excellent work which they are doing, not only for themselves and their neighboring farmers, but also for the general improvement of the agriculture of our country. The average increase in the yield of grain per acre for the three principal cereals grown in Ontario for the ten years, from 1897 to 1906, inclusive, over the average field per acre for the ten years, from 1887 to 1896, inclusive, is fully 18 per cent. This increase is undoubtedly due to a number of causes. The work of the Experimental Union, however, has surely exerted a marked influence by the introduction of superior varieties of crops and in the encouragement of improved methods of farming.

It must be remembered that all experimenters are not equally successful in their work, and especially is this true in the earlier stages of their experience. Many, however, become quite expert in their work. We find that no less than 1,693 experimenters have made good reports of successfully conducted experiments in each of two or more years previous to 1907. The Experimental Union has now an excellent corps of experimenters. Some of these combine the practical experience obtained on the farm, the educational training secured at the Agricultural College, as well as the special training furnished by successfully conducting co-operative work on their own farms for a number of years in succession. Some of the men have furnished good reports of successfully conducted experiments in each of ten or more years.

I firmly believe that the co-operative work of the Experimental Union will continue to grow in efficiency and in influence, and that similar work will gradually spread over many of the countries of the world, as its true value becomes better known and more thoroughly understood by the people. A somewhat similar organization to our own has been started recently in Scotland, and in each of at least seven of the States of the American Union. Under date of September 11th, 1907, I received a letter from Professor R. G. Greig, of the Agricultural College at Aberdeen, Scotland, from which I quote the following:—"Our work here is extending, and it will interest you to know that we have started an Experimental Union, but as yet of course on a small scale." Only the other day I received a letter from Professor Bailey, of Cornell University, in which he says, "I look upon your Experimental Union as the leader in this kind of work," and also another from R. W. Silvester, President of the Agricultural College at Maryland, in which he says, "I feel sure you are in closer touch with the active farmers in the Province of Ontario than is the case with any other institution in the western hemisphere." Probably most of the farmers of Ontario, when carrying out their individual experiments at their own homes, do not realize that the very work they are performing so faithfully is not only helpful to themselves and to their fellow farmers, but that the whole movement is being watched and even followed by the people of other countries. It is gratifying to know that the Experimental Union is exerting a wholesome influence in various ways. May the work of the past encourage us to press forward in a humble but hopeful and persistent manner to better and greater things in the future, and to thus make our work more perfect and more worthy of imitation.

PRESIDENT'S ADDRESS.

By J. M. McCallum, Shakespeare.

Again the wheel of time has turned, and finds us here at the 29th annual meeting of the Ontario Agricultural and Experimental Union. These annual meetings are milestones, marking the successive steps in the extension and progress of one of the great educational features of advanced agriculture in the Province of Ontario. In fact, the Experimental Union, emanating as it does from the Agricultural College, and emphasizing the principal results of research and investigation at this Institution, may be considered the pioneer, the bulwark, as it were, of the agencies working for a purpose, that purpose being the improvement of the agriculture of Ontario. What the Live Stock Associations of Canada are to the practice of animal husbandry, the Experimental Union is to the development of plant husbandry.

It is said that "In any great work there is no such thing as standing still," there must be either progress or retrogression. The record of the Union is one of continued progress from a very small beginning until the present time, when its full schedule of co-operative experimental work covers many fields of practical agriculture. Standing as we do at the close of another year, and looking backward over our work since our last meeting, we have good reasons for considering the past year a very successful one. The number of experimenters has increased, new lines of co-operative experiments have been introduced, and the reports, on the whole, indicate a steady appreciation of the experimental work. In one sense, the past year has been a most valuable one for variety testing; the dry season, and the presence of a blight on some of our crops being a first-class test of varieties for withstanding such conditions. It is in just such a season that the really strong features of good varieties are demonstrated.

In considering the whole work of the Union during its thirty years of existence, questions, such as the following, naturally arise: What are the material benefits of co-operative experimental work? Has the work of the Union furnished any real assistance in the progressive march of agriculture in Ontario? To the latter, I reply unhesitatingly and emphatically, yes, and to the former I say that the principal material benefits are five-fold, to say nothing of the numerous minor benefits resulting from participating in these co-operative experiments. In the first place, it furnishes in all of our crops the basis for the supply of pure seed, of the very best varieties, selected by competitive tests and adapted to existing conditions of soil and climate in this province. In this respect alone, the great results fully justify the continuance of the work. Secondly, it demands care and precision on the part of the experimenter, and encourages that attention to detail which leads to the very highest success in any branch of business, and particularly so in agriculture. Thirdly, it cultivates the habits of study and observation, the thoughtful summing up of results, which adds to a man's value as an experimenter. Fourthly, it has developed a bond of union, a feeling of kindred helpfulness among the seven thousand or more experimenters, and lastly, all of these may be summed up and stated in the one sentence—it adds to the agricultural status of our Province, keeping it well advanced in agricultural achievement.

Probably a brief glance at the present agricultural situation in Canada would not be out of place. At no period in the history of Canadian agriculture has there been such unbroken prosperity as during the past decade. It has been marked by phenonmenal increase in agricultural population and production and by a greater increase in the foreign demand for our products. Transportation facilities have undergone a much-needed improvement; trade relations have broadened and strengthened; in short, we may say that "agriculture has been booming." Keeping pace with this unprecedented growth in practical agriculture has been the growth in agricultural education throughout the Dominion. The Agricultural College sentiment appears to have spread from the Atlantic to the Pacific, and it pleases us to hear and read of the very satisfactory patronage which accompanies this sentiment. At this, the oldest of our agricultural institutions. the attendance is ever increasing, and "insufficient accommodation" is still the cry. The younger colleges, in Nova Scotia, Manitoba, and at Ste. Anne de Bellevue, are in a most flourishing condition, and there is every probability of another being established in one or other of the new provinces in the West. Moreover, agricultural instruction has been introduced into six of our Ontario High Schools. Truly these are growing times in Canada. Yet there are several problems confronting the agriculturist.

Transportation needs a still further improvement to insure the marketing of our fruit and dairy products in first-class condition. The problem of disposing of our products by some co-operative method is one which might well engage close consideration. The spread of noxious weeds causes us much uneasiness. The labor problem is really the most complex one confronting the farmer. Great as has been the tide of agricultural immigration, there is really a dearth of first-class farm labor, and a corresponding high water mark in its cost. However, just as a spot on the canvas serves to enhance the true brilliance of a picture, so the real brightness of our agricultural outlook is established by these problems. I cannot leave this subject of agricultural progress in Canada without referring to the magnificent victory gained by the O.A.C. judging team at Chicago last week. On behalf of the Experimental Union, I extend to President Creelman and staff of this College our heartiest congratulations on the brilliant work done by the team there. For three years in succession, in spite of recognized disadvantages, the students of the O.A.C. have demonstrated their superiority as live stock judges, and have firmly clinched the right to be permanent possessors of the fine torphy. The fact is now fully established that Canadian agriculturists, trained in a Canadian Agricultural College, are invincible when pitted against the best which America can produce.

Notwithstanding the fact that the Union is doing a great work, I believe that its field of usefulness can be enlarged. We all know that our province has a variety of soils, and, that to quite an extent, different soils exhibit different suitability for different varieties. For example in the growing of potatoes we have seen that certain varieties thrive best in the lighter soils characteristic to certain districts, while other varieties give best results in the heavier soils, and in the Muskoka districts, where they grow the finest potatoes I have yet seen, still other varieties stand in highest favor. Further, we know that there is quite a difference in the length of the growing season in different parts of the province, requiring the use of different varieties. For instance I would point out the necessity of growing different varieties of corn in different parts of the province. We must admit that it is inadvisable to grow in the northern parts of Western Ontario those varieties of corn which are in highest favor in Essex County. Moreover, I believe that the province could very easily be divided into three or four districts, depending on the soil and length of season. Therefore, I make the suggestion that in future published reports, the results of co-operative experiments be printed to show which of the varieties under experiment give the best results in these different districts. This means, certainly, an increase in the work at the department here and the addition of extra work in preparing the reports, but in consequence of this I feel tolerably sure that our Agricultural Department will increase the grant to the Experimental department accordingly. Further still, I believe that the following out of this scheme will result in strengthening the bond between the Experimental Union and the farming public, and will increase the benefits to be derived from the already efficient system.

One more suggestion and I have finished. The Ontario Agricultural and Experimental Union is the most adaptable medium for promoting the consolidation of the agriculturists and agricultural interests in the province of Ontario. When we consider how the manufacturers are combined to secure the most favorable conditions, legislative and otherwise, for promoting their own interests, and when in comparison we remember that this is essentially an agricultural country, especially favored by natural conditions for agricultural pursuits, then to our minds comes the thought that things are misadjusted. In the first place, farmers have inadequate representation in parliament in comparison to their numbers, and the great importance of their work in Canada. In the second place there is altogether too much individualism in the farming public—too great a prevalence of that one-man idea—displaying a deplorable lack of organization and co-operation, which lack has been to our own detriment. Then again, we often find that wholesome healthy rivalry among farmers interrupted by petty jealousies, thereby preventing the attainment of the highest good. In short, the prosperity of late years seems to have produced the sentiment "give all thought and attention to your own little world, and let the general good look after itself." But in the face of all this, and counteracting it to a certain extent, stands out prominently the work of the Experimental Union. By its growth, union and co-operation is secured, at least among its members. Farmers generally, recognize the true value of the work done by it, and would, I believe, follow its lead and be influenced by it as they would by no other organization existing in this Province to-day. A consideration of this thought, and a hopeful view of its feasibility opens to our eyes a vista most pleasant to behold. The work of the Experimental Union will never be finished. Men and events shall come and go, but it shall stay and grow and increase, until through time we hope to see it the unbreakable chain, binding together farmers and farmers' interests, holding for right and equity, setting the standard for research and experiment, and representing all that is noble and good in progressive Canadian Agriculture.

W. L. Smith, Editor Farmers' Sun, Toronto: The work of the Experimental Union is of more importance than that carried on by the Provincial Winter Fair at Guelph, important as the latter undoubtedly is. Crop production is at the basis of everything in agriculture. Without crop production, triumphs such as those won by John Campbell and James Leask in the live stock ring at the Chicago International Show would have been impossible. That the work of this Union is appreciated, is shown by the fact that the number taking part in it has increased from twelve, twenty years ago, to nearly 8,000 to-day. It is shown also in the interest taken in the reports of the co-operative experimental work as presented, by thousands who are not members of the Union.

The suggestion made by the president that the province be divided into districts, and the results of experiments, in each district, be published separately, is a good one. Something along this line has already been done in the details given by Prof. Zavitz in his annual address. A formal division would, however, be better, because conditions in different localities vary so much.

The point in the president's address which should have had the most serious consideration, is that dealing with co-operation. That is the principal question before the farmers of Ontario to-day. The day of the individual is past and gone for ever. We shall either have a system of co-operation under which farmers will divide among themselves, their full share of the profits coming from their toil, or tillers of the soil will be in the position of servants to great corporations.

I was pleased, too, in hearing what the president said, in regard to securing increased influence for farmers in the shape of legislation. Farmers cannot have the influence in this respect they should have so long as the present condition continues, under which we have twenty-five farmers in the House of Commons, while the total number of representatives is upwards of two hundred. I do not agree, however, with the president, in saying that this Union will be found the most effective means of making the farmer's influence felt in that respect. This Union exists for the purpose of assisting in educational work in regard to production and marketing. But there is another organization, through which farmers can make their influence felt in public affairs; that is the Grange, and I would like very much to see Mr. McCallum, and the young men here present, active members of that organization. By allying themselves with the Grange, they can become a power for good in assisting to give farmers what they have not now—their fair share in the control of public affairs.

Mr. A. E. SHERRINGTON: I can say with pleasure that I am very much in sympathy with the work. No farmer of the province of Ontario can place a proper estimate on the work that is being carried on by this Experimental Union. The reports of this Union are very valuable. I think the work might be increased somewhat in value by having five or six farmers in a neighborhood conduct the same experiment. I have made experiments in my own neighborhood, and have been as careful as I possibly could, but it is only one farmer and one experiment, and if we had five or six, then I think we would get results of even more value. I do not think we can do too much to forward the work of this Experimental Union. I do not think the farmer can do too much in the way of conducting these experiments. It teaches the farmer to be more careful in every transaction on the farm; it teaches him to be more reliable in making notes on the various changes in crops and to be more careful to note what takes place on the farm in every way. I am more interested in fruits than in anything else, and I can go within five miles of my own home and find the same fruits growing differently, although under the same treatment, and same cultivation, and therefore, I think, valuable work can be done by dividing the province into districts. I would suggest that every farmer, if possible, should accept one of these experiments, and conduct it on his own farm. By doing so, he will become a better and a more useful farmer, and a better citizen.

RESULTS OF CO-OPERATIVE EXPERIMENTS IN AGRICULTURE.

By PROF. C. A. ZAVITZ, AGRICULTURAL COLLEGE, GUELPH.

This has been rather an unfavorable year for most kinds of farm crops throughout Ontario, owing to the unusually cold and backward spring and to the small amount of rainfall in some of the sections of the province. In spite of these drawbacks, however, the committee on agricultural experiments is pleased to state that it is in a position to present a valuable report of good work accomplished during the past year. In 1907, there were upwards of 4,000 experimenters in agriculture, and a keen interest was shown in the work throughout. The tests with grains, potatoes, sweet corn, roots, and fertilizers have been on the whole very satisfactory and valuable, but those with fodder corn, sorghum, and rape have furnished but little information which is of much practical use. The results of experiments in a poor year are sometimes more valuable than those in a year when all kinds of crops produce abundantly. We are greatly pleased with the character of the work of a large number of our experimenters. They deserve great credit for successfully conducting the various experiments, and farmers owe much to these experimenters for the valuable reports which they furnished and which are here presented in a summary form.

During the past year we have had experimenters in every county and probably in every township of the province. We are pleased to note the fact that the farmers in the newer districts of the province are taking a very deep interest in this work. We are very glad indeed that this is the case, as it is important that the farmers in the newer portions of Ontario become familiar with improved methods of agriculture and secure at the very beginning of their operations the most promising varieties of farm crops.

For the benefit of those who are not familiar with our system of co-operation, it may be well to state that it is to a large extent the outgrowth of the experimental work done at the College, and that it is principally based on the results of that work. The experimental work in field agriculture was started at the College in 1876, and since that time it has gradually developed along various lines, until at present about two thousand plots are used annually in growing grains, fodder crops, grasses, clovers, roots, and potatoes; in testing manures and fertilizers, etc., with the object of obtaining information regarding the best varieties; the most productive selections of seed; the best time to sow the various classes of crops; the most improved methods of cultivation; the best mixtures of seed for the production of grain, hay, and pasture; the best methods of maintaining and increasing soil fertility, etc. Since the beginning of this work, over two thousand varieties of farm crops have been tested, and the best among these are now used for distribution in connection with the co-operative work of the Experimental Union.

In the spring of each year, circulars on the co-operative work are distributed by the agricultural committee appointed by the Union. These circulars give a list of all the experiments for which material can be furnished. They are sent by mail to the members of the Experimental Union; to the experimenters of former years who have done satisfactory work; to leading farmers whose names have been suggested by secretaries of Farmers' Institutes, secretaries of Agricultural Societies, principals of Collegiate Institutes, and inspectors of Public Schools. They are also sent to all persons asking for information regarding the co-operative work; and to all the newspapers of the province. In this way the work is brought to the notice of a very large proportion of the farmers of Ontario. The following gives the list of the co-operative experiments in agriculture, conducted throughout Ontario in 1907.

Co-operative Experiments in Agriculture in 1907.

Grain Crops.

	Plots
1 —Testing three varieties of Oats	3
2*a*—Testing three varieties of six-rowed Barley	3
2*b*—Testing two varieties of two-rowed Barley	2
3 —Testing two varieties of Hulless Barley	2
4 —Testing two varieties of Spring Wheat	2
5 —Testing two varieties of Buckwheat	2
6 —Testing two varieties of Field Peas	2
7 —Testing Emmer and Spelt	2
8 —Testing two varieties of Soy, Soja, or Japanese Beans	2
9 —Testing three varieties of Husking Corn	3

Root Crops.

10 —Testing three varieties of Mangels	3
11 —Testing two varieties of Sugar Beets for feeding purposes	2
12 —Testing three varieties of Swedish Turnips	3
13 —Testing Kohl Rabi and two varieties of Fall Turnips	3
14 —Testing Parsnips and two varieties of Carrots	3

Forage, Fodder, Silage and Hay Crops.

15 —Testing three varieties of Fodder or Silage Corn	3
16 —Testing three varieties of Millet	3
17 —Testing three varieties of Sorghum	3
18 —Testing Grass Peas and two varieties of Vetches	3
19 —Testing Field Cabbage and two varieties of Rape	3
20 —Testing three varieties of Clover	3
21 —Testing Sainfoin, Lucerne and Burnet	3
22 —Testing five varieties of Grasses	5

Culinary Crops.

23 —Testing three varieties of Field Beans	3
24 —Testing three varieties of Sweet Corn.	

Fertilizer Experiments.

25 —Testing fertilizers with Potatoes	8
26 —Testing fertilizers with Swedish Turnips	6

Miscellaneous Experiments.

27 —Sowing Mangels on the level, and in drills	2
28*a*—Testing two varieties of Early Potatoes	2
28*b*—Testing two varieties of medium ripening Potatoes	2
28*c*—Testing two varieties of Late Potatoes	2
29 —Testing three grain mixtures for grain production	3
30 —Testing three mixtures of Grasses and Clover, for hay	3

Autumn Sown Crops.

31 —Testing Hairy Vetches and Winter Rye as fodder crops	2
32 —Testing three leading varieties of Winter Wheat	3
33 —Testing five Fertilizers with Winter Wheat	6
34 —Testing Autumn and Spring Applications of Nitrate of Soda and Common Salt with Winter Wheat	5
35 —Testing two varieties of Winter Rye for grain production	2

Most of the plots were one rod wide by two rods long, being exactly one-eightieth of an acre in size. In former years some plots consisted of one-tenth acre and a few of one-half acre in size, but for most experiments these were found less satisfactory than the small plots.

For the following summary, only the results given in the most reliable reports were used. Many of these reports have been sent in by men who have had a large amount of practical experience on the farm, have had the advantages of a good education, and by means of conducting experiments in former years have become quite expert in the work. It should be remembered, however, that while only the good reports of carefully conducted experiments have been used for publication, many of those not included in the summary show that the individual experimenters must have obtained a considerable amount of value from the work. It frequently happens that, owing to some unavoidable accident, the experiment may be to some extent injured so that the results cannot be used in the general summary, and yet the experiment may have furnished useful lessons to the farmer conducting it. In all cases experimenters obtain much more information from the work which they have carried on than can be given in a tabulated report.

The average results of the successful co-operative experiments with grain crops are presented in the following table:—

GRAIN CROPS.

Experiments.	Varieties.	Comparative value.	Yield per acre. Straw (tons.)	Yield per acre. Grain (lbs.)	Yield per acre. Grain (bus.)
Oats (102 tests)	Imported No. 534	100	1.19	1,273	37.44
	Daubeney	86	1.15	1,154	33.95
	Improved Ligowa	91	1.18	1,154	33.95
Six-rowed Barley (42 tests.)	No. 21	100	1.03	1,487	30.98
	Mandscheuri	94	1.03	1,471	30.65
	Oderbrucker	61	1.04	1,306	27.20
Two-rowed Barley (3 tests.)	French Chevalier	100	1.60	1,146	23.88
	Two-rowed Canadian	50	1.52	860	17.92
Hulless Barley (6 tests.)	Black Hulless	100	.83	1,135	18.92
	Guy Mayle	100	.75	1,054	17.56
Spring Wheat 13 tests.)	Wild Goose	100	1.35	1,203	20.05
	Red Fife	92	1.64	1,145	19.08
Emmer and Spelt (5 tests.)	Common Emmer	100	1.51	1,768	44.20
	Red Spelt	63	1.17	952	23.80
Winter Wheat (8 tests.)	Imperial Amber	100	1.30	1,330	22.17
	Abundance	88	1.27	1,302	21.71
	Michigan Amber	88	1.21	1,215	20.25
Winter Rye (2 tests.)	Mammoth	100	1.08	1,480	26.43
	Common	50	1.02	1,200	21.43
Field Peas (42 tests.)	Early Britain	92	1.12	1,832	30.53
	New Canadian Beauty	100	1.28	1,572	26.20
Field Beans (12 tests.)	New Prize Winner	91	.61	1,235	20.59
	White Wonder	100	.60	1,220	20.33
	Marrowfat	70	.65	1,122	18.69
			Whole crop.		
Corn for Grain (12 tests.)	Genesee Valley	100	7.69	1,860	33.21
	King Philip	79	6.89	1,626	29.04
	Compton's Early	96	9.57	1,146	20.47
			Straw.		
Mixtures (4 tests.)	Daubeney Oats......34 lbs. per acre	100	1.37	1,340	
	Mandscheuri Barley 48 " " "				
	Siberian Oats.......25 " " "	73	1.51	980	
	Chevalier Barley...35 " " "				
	Goose Wheat......22 " " "				
	Siberian Oats......34 " " "	64	1.27	940	
	Chevalier Barley...48 " " "				

The first column of figures in this table represents the comparative value of the varieties, as estimated by the experimenters themselves. In making this comparison, all the characteristics of the varieties were taken into consideration. The yield of straw, as given in the second column, represents the total crop less the amount of grain, and therefore includes the chaff with the straw. The yield of grain is given in pounds and also in bushels per acre, in order that the results may be more clearly understood, and that comparisons may be made between the different classes of crops as well as between the varieties of each class. Owing to the great variation in the weight per measured bushel of the different crops, it is easier to compare the results in pounds than in bushels per acre.

Oats. Three varieties of oats were distributed in the spring of 1907, and one hundred and two reports of successfully conducted experiments were received. Of the three varieties distributed, the Imported No. 534 and the Improved Ligowa had given good satisfaction as general croppers in connection with the experimental work at the College. The Daubeney is a very early variety and is becoming popular among Ontario farmers where an early oat is desirable, to be grown either by itself or with a medium ripening variety of barley, such as the Mandscheuri. It will be seen from the tabulated results that the Imported No. 534 occupies highest place in comparative value and in yield of both grain and straw per acre. The Improved Ligowa is grown considerably in Ontario. It possesses a comparatively stiff straw, but is rather subject to the attacks of rust. The Imported No. 534 was reported by the experimenters as being comparatively stiff in the straw and very free from rust. The Siberian oats surpassed the Imported No. 534 in 1906 in both popularity and in productiveness. This variety, however, has now become so well known throughout Ontario that it was not included amongst the co-operative varieties for 1907.

Six-rowed Barley. Barley No. 21 was originated at our Agricultural College from one plant which was selected in 1903 from upwards of nine thousand plants of the Mandscheuri variety, produced from seeds which were planted by hand at a uniform distance apart. In the co-operative experiments over Ontario in 1907, this barley slightly surpassed the Mandscheuri variety in yield of grain per acre, strength of straw, freedom from rust, early maturity, and in general popularity, although the differences were only slight throughout. In 1906, the Mandscheuri barley gave a little better yield than No. 21, but the latter surpassed the former in general popularity when strength of straw and other characteristics were taken into consideration. It is also interesting to know that No. 21 gave the highest yield per acre of all barleys grown at the College in 1907. It will be remembered that the Mandscheuri barley was introduced by our College and distributed throughout Ontario through the medium of the Experimental Union. By replies received this year from Ontario farmers, we learn that about 74 per cent. of the barley now grown in Ontario is of the Mandscheuri variety. The introduction of this barley has undoubtedly had considerable influence in increasing the average yield of barley per acre per annum throughout Ontario about 24 per cent. for the last ten years, as compared with that for the ten years previous. The Oderbrucker variety was introduced from Germany and has been one of the closest rivals of the Mandscheuri.

Two-rowed Barley. The interest taken in two-rowed barley throughout Ontario is not great, as may be seen from the fact that we have fourteen times as many good reports from six-rowed as we have from the two-rowed varieties in 1907. It will be seen from the tabulated results that the highest yielding variety of two-rowed barley gave an average yield of about three and one-half bushels per acre less than the lowest yielding six-rowed barley. At the Agricultural College, the Canadian Two-rowed gave very good results indeed for a number of years previous to 1907. It was distributed throughout Ontario in 1906 for the first time, and in that year gave a greater yield and was more popular throughout the Province than the French Chevalier. The peculiar weather conditions of the past season, however, appear to be very unfavorable for the proper growth of the Two-rowed Canadian variety.

Hulless Barley. Hulless barley has been grown to a considerable extent in some parts of Ontario in recent years. Upwards of a dozen varieties have been under experiment at the College. The Black Hulless is the oldest and best known variety in Ontario. In recent years, however, it has been surpassed in yield per acre, both at the College and throughout Ontario, by the Guy Mayle variety. In 1907, however, the Black Hulless has given a slight increase in yield over the Guy Mayle, according to the reports of the experimenters. In spite of this, however, the Guy Mayle and the Black Hulless varieties were placed equal in the comparative results, when all points were taken into consideration.

Spring Wheat. The two varieties of spring wheat, distributed in the spring of 1907, represent two classes of grain. The Wild Goose is a durum wheat and is specially suitable for the production of macaroni, and the Red Fife is one of the finer grained wheats which produces flour of excellent quality. In the experiments at the College, the Wild Goose variety usually yields considerably more than the Red Fife. This generally holds true throughout Ontario in connection with the co-operative experiments. In 1907, however, the difference is not very marked, there being about an average of one bushel of grain per acre in favor of the Wild Goose variety. According to the reports of experimenters, the Wild Goose wheat is grown more extensively throughout Ontario than any other variety.

Emmer and Spelt. These represent two classes of wheat which are being studied more particularly for the production of feed for farm stock than for the production of flour. When threshed, there is not a separation of the grain and the chaff, but both are ground together into meal as feed for farm stock. The Emmer usually has about 22 per cent. of hull or chaff, and the Spelt about 30 per cent. It will therefore be seen that the amount of hull on the Emmer is considerably less than that of an average variety of oats. As was expected, the results of the co-operative experiments show that the Emmer has given a decidedly larger yield of grain per acre than the Spelt. It will be noticed from the chart that the Common Emmer gave a greater average yield of grain per acre in 1907 than that produced by the best varieties of oats, barley, wheat, or rye, but not quite equal to those of corn and peas.

Winter Wheat. A report, giving the results of experiments conducted with winter wheat and winter rye, both at the College and throughout Ontario, was sent to each of the agricultural experimenters throughout Ontario for 1907 and also to about three hundred and fifty of the newspapers of the Province. The Imperial Amber, which gave the greatest yield of grain per acre during the past year, is a close rival of the Dawson's Golden Chaff variety. The grain of the Imperial Amber, however, is of better quality than that of the Dawson's Golden Chaff for flour production. According to the reports received from the experimenters, the Imperial Amber proved to be very hardy, and possessed the longest and cleanest straw and the plumpest grain of the varieties included in the co-operative tests.

Winter Rye. Of the two varieties distributed in the autumn of 1906, the Mammoth surpassed the common variety in both height of plants and in popularity, amongst the experimenters.

Field Peas. For the three years previous to 1906, we sent peas only to those districts where the pea weevil had not been found troublesome. As the ravages of this pest were becoming decidedly less manifest, and as many farmers were beginning to increase the acreage of this crop, it was decided to send peas for experimental purposes to all parts of the Province from which applications were received. On averaging the results of the forty-two first-class reports which came to hand in 1907, we find that the Early Britain stands first in yield of grain with 30.5 bushels per acre, and the New Canadian Beauty, second, with 26.2 bushels. Notwithstanding the fact that the Early Britain gave an average of fully four bushels per acre more than the New

Canadian Beauty, the last named variety was placed first in the comparative value in the estimation of the experimenters. This was undoubtedly due to the fact that the grain of the Early Britain variety is of a brownish color and is somewhat shrunken in form, while that of the Canadian Beauty is large, smooth and white, and is hence a much better pea for market purposes than the first named variety. It will be noticed that the Early Britain gave a very high yield of grain per acre, being surpassed by no other grain crop in 1907 except by the Genesee Valley variety of corn, which surpassed the Early Britain peas by only 28 pounds of grain.

Field Beans. The Prize Winner variety of field beans, which has given very excellent results in the work at the College, stands the highest in yield of grain per acre of the three varieties of field beans tested over Ontario in 1907. This variety, however, was closely followed by the White Wonder, which has also made a high record at Guelph. Both of these varieties produce small white beans of excellent quality.

Corn for Grain. It will be noticed that the greatest yield of grain produced in connection with the co-operative experiments in 1907, was obtained from the Genesee Valley variety of field corn. This variety was distributed throughout Ontario in 1907 for the first time. In the average of six years' experiments at the College previous to 1907, the Genesee Valley gave an average of slightly over 60 bushels of shelled grain per acre, being one of the very highest yielders amongst the varieties tested. The Genesee Valley is a very early variety of eight-rowed yellow flint corn. The King Phillip, which stands second in yield per acre over Ontario in 1907, has also produced a very high yield in the experiments at the College. It is also an early eight-rowed flint corn, but the grain is nearly red in color. The Compton's Early is a twelve-rowed yellow flint corn, quite well known in many parts of Ontario, as it is grown more extensively than either of the other varieties in the experiment.

Mixtures for Grain Production. As a result of conducting extensive experiments with a large number of mixtures of grain for the production of grain for feeding purposes at the College, it has been found that a mixture of barley and oats has given a larger yield of grain than any other combination, and a larger yield even than any kind of grain grown separately. We have also learned that one bushel per acre of each is about the right quantity to sow, in order to produce the largest possible crop. In addition to this, we have found that certain varieties of barley and oats can be grown together to good advantage, because they mature at about the same time. In each of the past three years, we have distributed three mixtures for co-operative experiments, the first consisting of Daubeney oats and Mandscheuri barley, to be sown at the rate of one bushel of each per acre; the second, a mixture of Siberian oats and Chevalier barley, to be sown at the same rate; and the third, a mixture of Siberian oats, Chevalier barley, and Wild Goose spring wheat, to be sown at the rate of twenty-five pounds, thirty-five pounds, and twenty-two pounds per acre respectively. In each year the early mixture, consisting of Daubeney oats and Mandscheuri barley, gave the highest yield and stood first in the estimation of the experimenters for use on their farms. In the results for 1907 it will be observed that this mixture gave upwards of three hundred pounds more than either of the other mixtures.

Mangels. The three varieties of mangels, used in the co-operative experiments of 1907, represent three distinct types, viz., the long, the intermediate and the globe. A few years ago the long red mangel was grown much more extensively throughout Ontario than either the intermediate or the globe types. From inquiries made in 1907, however, we ascertained that the intermediate type is now grown about as extensively as the long red class. There are a large number of varieties of each of these classes, and according to our results at Guelph we find a considerable difference in the productiveness of the different varieties of each class. In the average results of twenty varieties of mangels of all classes grown at the College for five years in succession, we have obtained the greatest yield of roots per acre from Ferry's Yellow Leviathan. This is an intermediate yellow mangel and has given a greater yield per acre than all of the long red, as well as all of the other intermediate varieties. In each of four years in succession the Yellow Leviathan has given the greatest yield of roots per acre of the different varieties used in the co-operative experiments throughout Ontario. In 1907 it gave two tons per acre more than the Sutton's Mammoth Long Red, and nearly three tons per acre more than the Carter's Windsor Yellow Globe in the average of ten experiments. It was decidedly the most popular variety of mangel distributed, not only in 1907 but also in each of the three years previous.

FIELD ROOTS AND FODDER CROPS.

Experiments.	Varieties.	Comparative value.	Yield per acre.
			tons.
Mangels (10 tests).....	Ferry's Yellow Leviathan.........................	100	36.77
	Sutton's Mammoth Long Red.....................	70	34.71
	Carter's Windsor Yellow Globe..................	65	34.05
Sugar Beets (8 tests)...	Bruce's Giant White Feeding.....................	100	25.43
	Rennie's Tankard Cream..........................	63	22.39
Swede Turnips (4 tests)	Carter's Invicta..................................	100	32.18
	Sutton's Magnum Bonum..........................	88	31.53
	Rennie's Queen..................................	38	27.66
Fall Turnips and Kohl Rabi (3 tests)	Red Top White Globe Fall Turnip..............	100	29.55
	White Egg Fall Turnip	67	22.12
	Early White Vienna Kohl Rabi..................	44	12.44
Carrots and Parsnips.. (2 tests).	Bruce's Mammoth Inter. Smooth White Carrot....	100	20.60
	Steele's Improved Short White Carrot............	100	20.54
	Buckbee's New Sugar Parsnip.....................	40	10.92
Millet (3 tests)........	Japanese Common	86	10.44
	Japanese Panicle................................	100	10.10
	Hungarian.......................................	71	9.31
Grass Peas and Vetches (1 test.)	Hairy Vetches...................................	100	9.20
	Grass Peas......................................	90	8.80
	Common Vetches..................................	55	6.00

Sugar Beets for Feeding Purposes. The Giant White Feeding variety of sugar beets was compared with the Royal Giant in 1905 and again in 1906, and with the Tankard Cream in 1907. In each of these years, the Giant White Feeding variety gave the greatest yield of roots per acre and was the most popular in the estimation of the experimenters. According to the chemical analysis at the College the Giant White Feeding contained 7.8 per cent. sugar in the average of six years, and the Tankard Cream, 8.9 per cent. in the average results for five years. It will therefore be seen that the Tankard Cream has about one per cent. more sugar than the Giant White Feeding variety.

Swede Turnips. The Carter's Invicta and the Rennie's Queen varieties of swede turnips were used in connection with the co-operative experiments in 1907 for the first time. The Carter's Invicta had given particularly good results at Guelph. It seems specially suitable as a turnip, not only for the production of roots for feeding purposes, but also of roots for shipping to the American markets for table use. It has been selected as one of the choice varieties for this purpose amongst all the varieties tested at the College. In the co-operative experiments for 1907, the Carter's Invicta surpassed the Sutton's Magnum Bonum variety, which headed the list in each of the three years previous. This new variety, therefore, is making a high record for itself.

Fall Turnips and Kohl Rabi. Fall turnips are grown only to a limited extent throughout Ontario. As a rule, they do not keep long into the winter, and hence must be fed mostly in the autumn. The yields per acre of the fall turnips are sometimes higher than those of the Swedish varieties. In 1907, however, the yield of the fall turnips was rather lower than those of the Swedes. The Red Top White Globe occupied the highest place in yield per acre in 1904 and in 1905, as well as in the present year. In 1906, no good reports of experiments with fall turnips were received. The Kohl Rabi, which is grown to a certain extent in the Old Country as a feed for sheep and other kinds of farm stock, does not yield nearly as well in Ontario as our principal classes of roots now grown in the Province.

Carrots and Parsnips. It has been the rule for the past few years to send out one variety of parsnips along with two of carrots, in order that farmers may see for themselves the comparative yielding powers of these two classes of roots. The Mammoth White Intermediate carrot has been the leader in the tests for the past three years and is also one of the very best varieties grown at the College. The parsnip has given a decidedly lower yield than either of the varieties of carrots in each of the past four years.

Fodder Corn. Three varieties of fodder corn were distributed in the spring of 1907, viz., Henderson's Eureka, White Cap Yellow Dent, and Reid's Yellow Dent. Owing to the peculiar weather conditions, however, we have no satisfactory report to offer. These varieties have been carefully tested at Guelph, and the White Cap Yellow Dent especially has given particularly good results. This variety is now being grown considerably in the central and the north-western parts of the Province.

Millet. Owing to the peculiar weather conditions of the past summer, the millets did not give specially large results in the co-operative experiments, and we have a summary of only three successfully conducted tests to report. It will be noticed that the Hungarian Grass, the best known variety throughout Ontario, occupies the lowest place in yield of green crop per acre. This was also the case in 1905 and again in 1906. The Japanese Panicle, although a little the lowest yielder in the past year of the two Japanese millets, was the most popular with the experimenters. This is a variety of millet that has given excellent results at the College. When ordering this variety, farmers should be careful that they receive seed almost black in color, smooth, and very shiny. Several seedsmen, in advertising Japanese millet, illustrate the Japanese Panicle variety but describe the Japanese Barnyard millet. Some seedsmen have corrected this mistake, but others have not.

Sorghum. A considerable number of sorghums, including different varieties of sugar cane, broom corn, Kaffir corn, millo maize, Jerusalem corn, etc., have been grown at the College for several years in succession. Some of these, and especially the sugar canes, have given fairly good satisfaction. In some localities throughout Ontario sugar cane has been grown with a considerable amount of satisfaction as a fodder crop. The yield is almost as good as our leading varieties of corn, and the crop, which contains a large amount of sugar, is greatly relished by farm stock and fed either in the green or in the dry condition. As yet there is not a very great demand for sorghum seed in connection with the co-operative work. Although a few co-operative experiments were conducted in 1907, no reports have been received which can be used in the summary.

Grass Peas and Vetches. For the past few years Grass peas and two varieties of vetches have been used in the co-operative work. On examining the accompanying table it will be found that the Hairy vetches not only gave the greatest yield per acre, but were also more popular than either of the other varieties. The seed of this crop, however, is very expensive, frequently costing five to six dollars per bushel. It is therefore not likely that this variety will be grown to any great extent throughout Ontario.

Rape. The number of applications for the experiment with rape is quite limited, and owing to the peculiar weather conditions of the past summer, no good reports have been received which can be placed in a tabulated form.

Clovers. Three varieties of clovers, viz., Common Red, Alsike, and Mammoth Red are distributed for co-operative experiments each year. The experiments with these crops are chiefly valuable to the individuals conducting them. As the Common Red usually produces two crops in the one year and each of the others one crop per season, and as the Common Red is not apt to survive the second winter as well as the Mammoth variety, it is difficult to get accurate results which will form a good summary report. We believe, however, that this experiment is valuable in the excellent object lessons which it furnishes.

Perennial Crops. Another experiment which is of value chiefly to the individual experimenters and to others who are enabled to see the experiment, is one with Lucerne, Sainfoin and Burnet. In general, it may be said that the Lucerne is giving good satisfaction in many parts of Ontario. If sown on well drained soil it usually produces three or four good crops each year, and the fodder or hay made from it is of high feeding value when properly handled. The Lucerne is very profitable, grown as a soiling crop, since it gives a continuation of green fodder throughout the season. The Sainfoin is not proving so satisfactory for general cultivation as the Lucerne. The Burnet is a very hardy plant and is one of the best in furnishing pasture, when many other kinds of crops produce but little growth in the hot, dry period in the summer.

Grasses. A number of fairly good reports of experiments with grasses have been received. It is difficult, however, to present the results in tabulated form. The varieties which have been distributed during the last few years are the following: Tall Oat, Timothy, Orchard Grass, Awnless Brome, Tall Fescue, Western Rye and Lyme Grass. The Tall Oat grass has given the greatest yield of hay per acre in the average results of all the reports received during the last three or four years. The Western Rye grass stood the highest in yield of hay for 1907, the yield being about three and one-half tons of hay per acre.

METHOD OF SOWING MANGEL SEED.

Experiments have been conducted at the College for a number of years past to determine whether it was better to sow the seeds of root crops in drills or on the level ground. In the majority of cases it was found that a larger crop of roots was produced when the seeds were sown on the level. It was decided, therefore, in the spring of 1906, to include an experiment of this kind as one of the co-operative tests for that year. The experiment was again repeated in 1907. In these years, mangel seed was distributed to a number of applicants. The results so far have not been sufficient to present in summary form, but the indications are rather in favor of level cultivation. This experiment will likely be repeated in the future, and we hope to get fuller reports of carefully conducted experiments.

SWEET CORN FOR HOME USE.

Sweet corn for table use is greatly relished by a large number of people both in the city and in the country. There are now a very large number of varieties, some being early and others late, some producing large ears and others small, and some being very tender and juicy while others are of rather inferior quality. Upwards of fifty varieties of sweet corn have been tested at the College for productiveness and for table quality. During the past few years a few of the choice varieties have been selected for co-operative experimental work. In the spring of 1907, three varieties were distributed for testing throughout Ontario. The following table presents some of the averages of the principal results of these experiments:

Experiment.	Varieties.	Comparative value.	Table quality.	Number of ears per plot.	Number of days until ready for table use.
Sweet corn (20 tests)....	Ringleader..................	87	74	119	96
	Golden Bantam................	100	100	114	97
	Mammoth White Cory........	84	64	102	104

The Ringleader variety of sweet corn is very early and produces a large amount of ears. The ears are quite small but are of good quality. The Golden Bantam is ready to use at about the same time as the Ringleader. Of all the varieties of sweet corn grown at the College, the Golden Bantam has given the best satisfaction for table use. The ears are rather small, yellow in color, and possess eight rows. The corn is exceedingly tender and possesses an excellent flavor. In the co-operative experiments over Ontario in 1907, the Golden Bantam corn was reported by the experimenters as possessing the best table quality and as being the choice of the varieties tested for home use. During the three years in which the Golden Bantam variety has been tested, it has occupied decidedly the highest place each year for table quality. The Mammoth White Cory, which is the best known variety throughout Ontario, was inferior to the Golden Bantam in nearly every respect.

VARIETIES OF POTATOES.

By inquiries made through the Experimental Union during the past season as to the varieties of potatoes most extensively grown in the different counties throughout Ontario, we received the names of sixty-four different kinds. The majority of these, however, were not mentioned in more than one or two counties. It was rather pleasing to learn that the three varieties most largely grown throughout the Province, were each distributed quite extensively through the medium of the Experimental Union as far back as 1896. Those varieties which appear to be mostly grown in Ontario at the present time are the following:—Rural New Yorker No. 2, Empire State, American Wonder, Early Ohio, Early Rose, Beauty of Hebron, Carman's No. 1 and No. 3, and White Elephant.

In the spring of 1907, the Experimental Union distributed three varieties of late, three varieties of medium, and seven varieties of early potatoes for co-operative experiments. Only two varieties were sent to each experimenter, but as the same varieties were sent to each experimenter with each class of potatoes, a basis was formed for summarizing the results given in the reports. A very large number of applications were received and upwards of four hundred first-class reports were sent to us this autumn, and have been embodied in the summary presented in the following table:

Experiments.	Potatoes.	Comparative value.	Per cent of small tubers.	Mealiness when cooked.	Bushels of whole crop per acre.
Late varieties (89 tests)..	Empire State	100	7	100	157.78
	Gold Coin	74	7	90	144.73
	Carman No. 1	68	8	84	118.72
Medium varieties (108 tests)	Burpee's Extra Early	100	8	100	151.18
	Rose of the North	78	11	81	147.14
	Early Hero	67	11	78	136.20
Early varieties (217 tests)	Extra Early Eureka	96	15	79	149.58
	Early Harvest	97	12	100	149.36
	Early Fortune	100	13	93	143.94
	Early Andes	100	10	88	129.64
	Early Dawn	87	12	93	117.12
	Early Pinkeye	58	22	67	95.22
	Stray Beauty	57	29	63	66.79

The results in the foregoing table are exceedingly interesting. Of the late varieties, the Empire State has been included in the co-operative experiments for a number of years, but the Vermont Gold Coin and the Carman No. 1 were distributed in the spring of 1907 for the first time. The Empire State variety, which is probably grown more extensively throughout Ontario at the present time than any other variety with the exception of the Rural New Yorker No. 2, is a very excellent potato. In the average results of all the experiments with varieties of potatoes conducted throughout Ontario in 1907, the Empire State gave the highest yield per acre. The percentage of small tubers was very small, and the quality of the potatoes was excellent. The comparative value given by the experimenters was 100 for Empire State, as compared with 74 for Vermont Gold Coin, and 68 for the Carman No. 1.

Among the three medium varieties distributed in 1907, the Burpee's Extra Early gave the best results in yield per acre, size of tubers, quality of potatoes, and general popularity. The Early Hero, which was distributed this year for the first time, gave comparatively low results.

Upwards of two hundred good reports of early potatoes were received. The Early Eureka and the Early Harvest were distributed in 1907 for the first time. The Early Fortune, however, has been distributed on several occasions and has always given good results in former years. Although it was slightly surpassed in yield in 1907, it will be noticed that it was even this year more popular with the experimenters than either the Early Eureka or the Early Harvest varieties. The Early Pinkeye and the Stray Beauty gave exceedingly low results. Although the weather conditions of the past season have been rather unusual in many parts of the province, the season has been a very good one for the testing of varieties of potatoes. Only the strong varieties gave satisfactory returns during the past summer. All who are interested in the growing of potatoes should study carefully the results here presented.

FERTILIZERS WITH FARM CROPS.

As considerable co-operative work has been done along the line of testing a number of fertilizers with various classes of farm crops, a table is here presented which gives a summary of the results of all the experiments conducted within the past fifteen years, including the tests of fertilizers with winter wheat in 1907 for the fourth time, and those with potatoes for the first year.

Kind of fertilizer used.	Fertilizer per acre.		Average yield per acre.						
			Oats	Winter wheat	Fodder Corn.		Mangels.	Swede turnips.	Potatoes.
					Total	Ears			
	Weight	Cost	5 years 74 tests	4 years 9 tests	8 years 47 tests	8 years 41 tests	5 years 41 tests	4 years 12 tests	1 year 22 tests
	lbs.	$	bus.	bus.	tons.	tons.	tons.	tons.	bus.
Nothing	....	....	38.9	18.7	8.2	2.7	20.6	21.9	107.2
Nitrate of soda	160	4 80	46.3	22.5	9.4	3.1	26.5	24.1	138.6
Muriate of potash	160	4 00	43.8	21.2	9.4	3.0	24.6	24.9	144.3
Superphosphate	320	3 92	43.6	21.1	9.0	3.1	24.2	25.9	146.3
Complete fertilizer	213	4 24	48.7	23.7	9.4	3.2	25.4	27.2	152.9
Potato fertilizer	320	5 52	....	....	....	....	....	....	149.1
Royal Canadian	320	5 60	....	....	....	....	....	....	149.0
Cow manure	40,000	6 00	....	25.4	....	....	....	30.1	158.8

In each of the years, both the fertilizers and the seeds have been sent from the College to the experimenters. In every instance, the nitrate of soda and the muriate of potash have been applied at the rate of 160 pounds per acre, and the superphosphate at the rate of 320 per acre. The mixture or complete fertilizer has been composed of one-third the amount of these fertilizers, making in all 213⅓ pounds. Both the Royal Canadian and the potato fertilizer used in 1907 with the potato crop, were applied at the rate of 320 pounds each per acre. In all cases, the nitrate of soda has been applied when the plants were about three inches in height, and all the other fertilizers at the time of sowing the seed. Farmyard manure has been used in the experiments of the past six years. The advice of each experimenter has been to apply 500 pounds of average cow manure per plot, the application being equal to twenty tons per acre. The cow manure has been mixed with the soil to a depth of from four to five inches, and the fertilizers have been stirred in the soil to a depth of from one to two inches.

In connection with the co-operative work, experiments have been conducted throughout Ontario with fertilizers on oats for five years, winter wheat for four years, fodder corn for eight years, mangels for five years, swede turnips for four years, and potatoes for one year. The reports for 1907 are confined to the experiments with fertilizers with winter wheat, and with potatoes.

The price of commercial fertilizers varies somewhat from year to year. The writer, therefore, corresponded with a number of the Canadian firms who sell fertilizers, asking them the prices at which they expected to sell their fertilizers for delivery next spring. The cost of each fertilizer, as given in the table, represents, therefore, the present cost per acre for the fertilizers as used in the co-operative experiments in 1907. The quotations were the factory prices for quantities of about one-half ton. The twenty tons of cow manure would mean about twelve good sized loads per acre, and manure in Guelph has been selling at 50 cents per load, which is probably about the average for the province. It is exceedingly difficult to place a price on farmyard manure, as in most cases it is not purchased but is produced on the farm. Each person may place such value on the manure as he deems expedient, and study the results according to his own circumstances. It should be remembered that the freight on the fertilizers and the application of both the fertilizers and the manure are not taken into consideration in the foregoing statement, nor yet is there any account made of the future influence of the different fertilizers and the manure upon the land.

Fertilizers with Oats.—Seventy-four good reports of successfully conducted experiments in applying fertilizers to oats were received during the five years in which this experiment was conducted over Ontario. The lowest yield was obtained from the unfertilized land, 38.9 bushels per acre; and the highest average yields from the mixed fertilizer, 48.7 bushels; and the nitrate of soda, 46.3 bushels per acre. The unfertilized land produced the lowest yield per acre in each of the five years. The mixed or complete fertilizer gave the largest yield of oats per acre in the average results of this experiment in each of the five years in which it was conducted. Although the land which received the mixed fertilizer gave an average of 9.8 bushels of oats per acre more than the unfertilized land, still this increase was produced at a cost of about 42 cents per bushel, according to the present prices of fertilizers. It will therefore be seen that it is only in special years that the commercial fertilizers will give economical results with oats on the average land of Ontario. The mixed fertilizer gave a larger average yield than no fertilizer on heavy soils by 12.7 bushels per acre, on light soils by 10.2 bushels per acre, and on black mucky soils by 7.1 bushels per acre.

Fertilizers with Winter Wheat.—In the co-operative experiments with different manures, applied in the spring of the year, the average yields of grain per acre for the past four years are presented in the accompanying table. It will be seen that the greatest average yields were produced from the application of cow manure and from the use of the mixed fertilizer. According to the prices of fertilizers given in the table, the most economical increase in the yield of winter wheat was made by the application of the mixed fertilizer, and even in this case the cost of the increased yield amounted to 85 cents per bushel. Every bushel of increase in yield, produced by the use of superphosphate, was obtained at a cost of $1.63.

Fertilizers with Corn.—In the average of experiments in applying fertilizers with corn in each of eight years, during which time forty-seven complete and satisfactory reports were received, it will be seen that the yields of whole crop produced by the plots which received an application of nitrate of soda, muriate of potash, and mixed fertilizer, were equal, while a plot on which superphosphate was applied produced nearly half a ton less than the others, and that the largest yield of husked ears was obtained when the mixed fertilizer was applied to the land. The muriate of potash produced the corn at the least cost per ton, but even with this fertilizer it cost $3.33 on the average to produce each additional ton of fodder corn.

Fertilizers with Mangels.—During the five years in which fertilizers were used with mangels, forty-one good reports of successfully conducted experiments were received. These show that the smallest average yield was produced from the unfertilized plot; viz., 20.6 tons per acre, and that the largest average yield was produced from the nitrate of soda; viz., 26.5 tons per acre. As in the case with corn, the unfertilized land gave the lowest yield in each year. The nitrate of soda produced the highest yield in four out of five years. The average of 197 bushels of mangels per acre, produced by the nitrate of soda over the unfertilized land, was obtained at a cost of about 2.4 cents per bushel. The nitrate of soda produced the largest yield on both heavy and light soils, but on the black loams the muriate of potash gave the highest yield of mangels. The nitrate of soda showed the greatest influence upon the light soils, as in the average of fifteen experiments the sandy land which was fertilized at the rate of 160 pounds of nitrate of soda per acre gave an average yield of 7⅝ tons per acre more than the land which was unfertilized.

Fertilizers with Swede Turnips.—On averaging the results given in all the reports of the test of fertilizers with swede turnips, we find that barnyard manure has been instrumental in producing the largest yield of roots, and that mixed fertilizer stands second in this respect. According to the prices given for the manure and the fertilizers in the foregoing table, the increased yield of turnips was produced at a cost of 73 cents per ton by the use of cow manure, and 80 cents per ton or 2.4 cents per bushel by the use of the mixed fertilizer.

Fertilizers with Potatoes.—Thirteen different kinds of fertilizers were used with potatoes at the Agricultural College for five years in succession. In these experiments, the Royal Canadian Fertilizer gave the highest, and what is known as the Potato Fertilizer, the second highest yield of tubers per acre. Another fertilizer experiment was then arranged, and after conducting it for five years in succession, it was found that the highest yield was obtained from a mixed fertilizer similar to the one used in connection with our co-operative work with other crops. This, however, was closely followed in yield by the Royal Canadian and by the Potato Fertilizer. The last two are both complete fertilizers, each containing nitrogen, phosphoric acid, and potash. The Royal Canadian Fertilizer is sold by the Capelton Chemical Co., Buckingham, Quebec, and the Potato Fertilizer by the W. A. Freeman Co., Hamilton, Ont.

In the spring of the present year both potatoes and fertilizers were distributed from the College throughout Ontario. From these experiments twenty-two good reports of successfully conducted tests were received, the average results of which are presented in the foregoing tabulated form. It will be seen that of the commercial fertilizers the mixture came first, while the Royal Canadian and Potato Fertilizer gave practically four tons per acre less. Each of these three fertilizers, however, gave upwards of 40 bushels per acre more than the unfertilized land. The highest yield of all was produced by an application of cow manure at the rate of 20 tons per acre. According to the prices given in the table, the cost of the increase in bushels of potatoes per acre was in each case as follows: mixed fertilizer, 9.3 cts.; superphosphate, 10 cts.; muriate of potash, 10.8 cts.; cow manure, 11.6 cts.; potato fertilizer, 13.2 cts.; Royal Canadian fertilizer, 13.4 cts.; and nitrate of soda, 15.3 cts. The majority of the experimenters tested the potatoes grown from all the fertilizers and reported the results for both flavor and mealiness. It was found, however, that the table quality was influenced but very slightly indeed by the fertilizers, there being only a variation of five per cent. in the average results, in reference to the table quality. The average results of the nine experiments, conducted on sandy soil, show that the potato fertilizer stands at the top of the list, and that this was followed quite closely by the cow manure and the muriate of potash. On the clay loam and heavy clay soils, however, the highest average yield was produced by the cow manure, and the second highest, by the Royal Canadian Fertilizer. A large amount of interest was shown in this experiment throughout the province, and it will likely be repeated in the future tests of the Experimental Union.

A MEMBER: For early sowing, is the Daubeney variety of oats a successful grower?

Prof. ZAVITZ: The Daubeney is a very good variety. It is exceedingly early, is white in the grain, thin in the hull, having about 24 per cent., and it is one of the very best varieties of very early oats in production of grain.

Mr. CREELMAN: Would the grain production make any difference if the crop is used for soiling purposes?

Prof. ZAVITZ: I think possibly it would, because the soiling crop is not generally used until it gets pretty nearly ripe, or at least until the grain is in the dough condition. I think oats with a greater amount of kernel when ripe would likely have a large amount of nourishment when cut for soiling purposes.

A MEMBER: Would it be one of the best oats to sow for early cropping?

Prof. ZAVITZ: It has proven itself to be one of the very best.

A MEMBER: How is its straw?

Prof. ZAVITZ: Fairly strong, and of a good length. Under similar conditions, it would stand up about the same as the American Banner.

Mr. HYATT: Did you make any experiments with sweet corn for canning purposes?

Prof. ZAVITZ: Yes, at the College, but not in the co-operative experiments.

Mr. HYATT: We feel the day is coming when these things are to be taken charge of by the Experimental Union. I am here to look after this matter a little bit. We could have ten million cans of sweet corn in the little county of Prince Edward, and we are here to ask if you cannot see your way clear to help us to develop the canning industry of Ontario.

Prof. ZAVITZ: The results of the co-operative experiments with sweet corn will come up later. Our co-operative work with sweet corn has been more particularly with corn for home use than with corn for canning purposes. Sweet corn is being tested in both the Field Husbandry and the Horticultural departments, and I know that the latter department has been conducting some canning tests during this year. The canning industry will be looked after as well as possible.

A MEMBER: How does Genesee Valley corn compare as to earliness with the rest?

Prof. ZAVITZ: I think probably it is a couple of days earlier than the Compton's Early, and also slightly earlier than the King Phillip.

Mr. SMITH: How do you account for the great falling off in the yield of oats this year?

Prof. ZAVITZ: The cold, backward spring and the unfavorable weather conditions. The early varieties have given the best results this year.

Mr. Smith: Year after year, the Daubeney and the Mandscheuri together gave much greater yields than the Mandscheuri alone. This year, the combination is 100 pounds less than Mandscheuri. Would you recommend growing this mixture for feed?

Prof. Zavitz: Yes, most decidedly, when grown under uniform conditions. These tests were not made on the same farms. These grains have practically always given much larger yields, if grown together, than if grown separately.

A Member: Would you sow that mixture as grown, or would you make a fresh mixture every year?

Prof. Zavitz: I would mix the oats and the barley in definite proportions each year. You would find that in your mixed crop there would be a larger proportion of barley than was sown. Barley will increase more rapidly than the oats, and if you take the seed from the mixed crop you will get a different proportion of the two grains. We have taken twelve different kinds of grain and mixed them together in the proportion of eight and one-half per cent. of each, and in the resultant crop found that, instead of there being eight and one-half per cent. of barley, there was eighteen per cent. Barley will come out on the top in the fight every time.

A Member: What proportion do you sow?

Prof. Zavitz: We have sown nine different proportions for six years, and so far we have obtained the largest yield by growing one bushel each by weight, 34 pounds of oats and 48 pounds of barley. In the dry seasons we have obtained slightly better results by sowing a bushel and a half of barley and a bushel of oats. Taking six years into consideration, however, a bushel of each gave us the best results.

A Member: What time was the millet sown?

Prof. Zavitz: We have been carrying on experiments in sowing each of three varieties of millet at different dates, starting quite early in the spring and sowing every two weeks all summer, and we found that we got the largest yield per acre from sowing about the middle of June.

A Member: I sowed some millet this year about the second week of July, and it grew all right, but it was not worth cutting.

Prof. Zavitz: Was it too late in growing?

A Member: The weather was dry and it did not grow well. I got it for the Japanese Panicle.

Prof. Zavitz: Was it brown or black seed?

A Member: It was brown seed.

Prof. Zavitz: The seed was that of the Japanese Barnyard millet and not Japanese Panicle. The seedsmen are all mixed up with regard to these millets, and if you look at a number of the catalogues you will find that they are illustrating one variety and describing another. They illustrate Japanese Panicle and they describe the Japanese Barnyard millet, which is another millet and has a brown seed, and an entirely different form of head, and gives decidedly lower results. If you are asking for the Japanese Panicle millet, be sure you get seed that is black or very dark brown, almost round, and very shiny.

A Member: How does the Empire State potato stand as regards resistance to rot and blight?

Prof. Zavitz: It is rather better than the average with respect to the freedom from rot. It is about as good as any of the varieties that are grown very extensively, and it is very much better than some of them. There are a few of the newer varieties that are fairly free from rot, but the trouble is that most of these varieties that seem to be fairly immune to rot seem to be either poor yielders or poor in quality.

A MEMBER: Have you the Delaware?

Prof. ZAVITZ: Yes, we have had the Delaware variety in our own experimental plots for years.

Q.—Does it not yield as well as the others?

A.—No, it has not yielded nearly as well as the Empire State.

In this summary report we have to speak of the Province either in large districts or as a whole. I wish we could classify the Province into smaller sections, and go more into detail and find out the results of the tests of the various neighborhoods. Our co-operative work does that in an admirable way, but it is impossible to bring out the detailed results in the time at our disposal at the annual meeting. We are taking experiments right to the farmer, and he can find out for himself, and that is the real foundation of our co-operative work, and if it was not for that we would drop our work at once.

Mr. NASH: I had an idea that you could plant an early potato very early and get it out of the way before it would be subject to blight. I had an early strain of Ohio potatoes, and planted them early, and got them out of the ground as soon as possible and there was no rot, and the others were badly blighted.

Prof. ZAVITZ: Some early varieties are almost free from blight. Stray Beauty and Early Pinkeye potatoes are two of the freest from rot. We have not found a potato yet but what has at least a slight tendency to rot. The varieties of potatoes vary from about two and a half to forty-two and a half per cent. of rot.

Mr. MASON: Would that be after spraying?

Prof. ZAVITZ: We used the Bug Death, which is supposed to check the rot, but it does not stop it. The Beauty of Hebron potato, known quite well throughout Ontario, and still grown quite extensively, is one that is most subject to the rot of all the potatoes we have tested, averaging over 40 per cent. of rot.

Q.—What is the best variety of sweet corn?

Prof. ZAVITZ: We are testing sweet corn more for home use than for commercial use in the Union work. We distributed three varieties in the spring of 1907 for the people to test at their homes. You ask me the best variety of sweet corn in Ontario for home use, and I can give you no other answer except that my own opinion, and that of the experimenters throughout Ontario, is that the Golden Bantam is the best. I was told at one place, that if I would run for Member of Parliament with the Golden Bantam corn as one of the planks of my platform, my election would be assured. It is very tender, juicy, and sweet. If you want a fine sweet corn for your table, try the Golden Bantam. We have sent it out for experimental purposes for three years, and it has been the most popular variety and has been reported to be the best quality of the varieties tested in each of the three years.

Prof. HUTT: As a rule we have been in the habit of planting several varieties of corn each season, but after trying the Golden Bantam for a few seasons and finding out the value of it, and its extreme earliness, we are planting it now in succession, and we have in it one of the very best corns. It makes a good one to plant in succession and gives a first-class corn from the first to the last of the season and it keeps for a long time in a fit state for use.

A MEMBER: Is any consideration given to the nature of the ground on which these experiments with commercial fertilizers are conducted?

Prof. ZAVITZ: Yes, we ask every experimenter to sow the fertilizers upon the average soil of his farm so that he may learn as correctly as possible the requirements of his own farm. In reporting, the man states the kind of soil he uses in every case. We have taken the average results of clay soils and of sandy soils and of muck soils, and the separate results of all these are given in the report.

A MEMBER: What time in the season were these fertilizers applied?

Prof. ZAVITZ: The muriate of potash, superphosphate, Royal Canadian and potato fertilizers, and the cow manure were all applied at the time the potatoes were planted. Cow manure was mixed through the soil to a depth of about 3 or 4 inches and the fertilizers were worked in the soil about 2 inches from the surface. Later on, when the plants were up about 2 inches, the nitrate of soda was sown and then the soil was again stirred on all the plots to a depth of about 2 inches, so that those that got the nitrate of soda would get no special advantage over the others from the cultivation.

A MEMBER: Were the fertilizers all put on broadcast?

A.—Yes, all were sown broadcast.

Q.—What about putting manure on in the fall for next year's root crop?

A.—A good many people are doing it with a good deal of satisfaction.

Q.—Is it better worked in in the fall?

A.—We find it is a very good thing to put it on in the fall and then ridge up the land before winter sets in. When you put a cultivator on it in the spring, it crumples down beautifully and leaves the land in splendid condition.

Q.—Have you a chart to show the results of your work with commercial fertilizers at the College, as compared with the average work of the farmers throughout the Province?

A.—Yes, I have in my office, and we have part of the results in some of the College reports. There is no report which has all the work with fertilizers together in the one place.

Q.—My recollection is, that in your own work you show results very much better than that?

A.—Yes, we have higher yields and in some cases rather greater differences. Generally speaking, however, the results of the co-operative work correspond with our college work very closely indeed.

Q.—And the results you have obtained have been similar to the results obtained in Europe and the United States?

A.—That is quite true in a general way.

Mr. MASON: You actually got profitable results from the fertilizers in every case where your land was cultivated, but not in the grain crops?

Prof. ZAVITZ: If we apply fertilizers to such crops as potatoes and roots we get very good returns. Fertilizers can sometimes be used to very great advantage with garden stuff, and with potatoes and mangels and beets and turnips, but we have found that it has been very difficult to use fertilizers with grain crops and to do it economically. I have even greater hopes for the future than ever before with regard to the work of the Experimental Union. (Applause.)

The CHAIRMAN: I hope in the near future we may see our way clear to have these meetings occupy a whole week. I do not think the farmers of the country can spend a week more profitably than in the discussion of the year's experimental work.

WHAT WE EXPECT FROM THE GRADUATES OF THE AGRICULTURAL COLLEGE.

By Hon. Nelson Monteith, Minister of Agriculture, Toronto.

I regret, indeed, that I was unable to be with you yesterday to hear what you had to say upon the great problems relating to agriculture. I am glad to be with you this morning, and I am especially pleased to learn that the past year has been a most successful year under your Presidency; and I am also well pleased to believe that you have made a wise selection in your President for the next year. (Applause.) I can speak with a certain amount of knowledge of Mr. Brodie. As sons of the soil, we same to this Institution some twenty years ago, and joined fortunes as room mates at the O.A.C., and through the College work of three years, Mr. Brodie secured a very high standard. I am glad to know that Mr. Brodie has brought a great deal of credit to the College since leaving its halls, and his example should be an incentive to the young men who are here this morning, many of them questioning in their minds as to whether they should go back to the farm, with what so many believe the accompanying drudgery, or whether they shall seek a wider field in the commercial world.

We are glad to know that honor has been brought to this College by men in other lines than that of agriculture and the farm. Graduates from this Institution are doing splendid work to-day in newspaper work, where we believe their influence for popularizing this institution, and for raising agriculture to that dignity which properly belongs to it, will be great.

I want to say a few words this morning as to what we expect from the graduates of this institution. You have a very large part to play on the agricultural stage as it is constructed to-day. In this great Province of Ontario, you are the men that the farmers, I am glad to say, look to, to a certain extent, along agricultural lines. It was not so at the time I was a student here. At that time we had to walk very gingerly when we went home; in fact we had to be very humble, and lowliness was the ladder we had to climb. We had to start in a very modest way, and assume very little as to what we had learned here. At that time it was thought we were taught at this College to plow straight, and that that was the chief object of this institution. Things have changed since then. Men are beginning to read, and our farmers are beginning to become intelligent as to the work of this institution; and they now look to you as experimenters, and as men, to lead them onward in this work. What I wish to impress upon you is that we have found the young men of this institution just a little too modest when we have called on them to go out in connection with the organization of Farmers' Clubs and of Farmers' Institute work. I believe you have the ability to do this work, but apparently you are not at all anxious. I appreciate the fact that the majority of our young men, when they go back from the College to the farm, have a difficult struggle in dealing with the problems of hired help, of the finance and of the business of the farm, and that they are compelled to apply themselves closely, but we should have now a number of our young men who have got over that stage and who are in a position to come forward and give their services for the uplifting of Agriculture.

I have not much to say further, but I thought the opportunity was so good that I would be guilty should I neglect to impress that fact upon you, that we are looking to the young men of this institution to help carry forward the great work of agriculture. We are glad to know that a number of our young men have been teaching along agricultural lines at various points in the Province. We believe this will be developed further during the next year, and through School Gardens will be able to get into closer touch with this institution. I believe if we can sow the seed early that the crop will be more abundant than it is at the present time. I thank you, Mr. President, for this privilege of speaking a few words to the men who, I believe, are largely guiding the destinies of this country. (Applause.)

CO-OPERATIVE EXPERIMENTS WITH VEGETABLES AND IN FRUIT GROWING.

By Prof. H. L. Hutt, O.A.C., Guelph.

The co-operative testing of vegetables through the Experimental Union was taken up this year for the first time, the plan adopted being much the same as that by which we have been testing fruits for the past fifteen years. As with the fruits, the work has begun with a few of the varieties which have given the best results in our experiments at the College.

Experiments with Vegetables.

The crops with which experiments were conducted this year were beets, carrots, lettuce, and tomatoes, three of the leading varieties being sent out for each test. We hope to extend the work next year by adding other classes of vegetables upon which careful experimental work has now been done at the College. Seeds were sent out for 1,481 experiments. These were sent into every county and district in the Province.

One of the objects of this work is to call attention to the importance of the vegetable garden as an adjunct to the home, not only in the country where it has been sadly neglected, but also in towns and cities where the small backyards may be so utilized to good advantage. These small but carefully couducted tests all over the country can be made a strong factor in promoting the economic side of rural and civic improvement which will tend to an improvement of the home and its surroundings generally.

School Children Interested in Experiments.

As all of this work has its educational as well as its practical value, it was thought wise to introduce it into the schools of the Province. With this end in view, we communicated with all the school inspectors to find out how many of the schools in Ontario were interested in school gardening. In this connection we may say that every inspector who had schools with school gardens in his inspectorate, appeared to be proud of them, and most of those who had not were desirous of having them established. In this way, we were able to introduce these co-operative tests into about thirty schools,—every school having a school garden—and also in some schools where gardens have not yet been established. In the latter the pupils took the seeds home and grew them in their own gardens.

As an example of the interest taken in this work by the school children, we may refer to what was done by the school children in the city of Guelph, where, through the hearty co-operation of the teachers, over five hundred children conducted experiments in their own gardens most successfully. Recognizing the importance of this work, the directors of the Guelph Central Exhibition gave additional encouragement to it by offering $35 in prizes for the children's exhibits in connection with these experiments. The result was that the children's exhibits became one of the chief features at the exhibition this year, and the interest shown by the scores of enthusiastic young exhibitors put new life into this section of the exhibition. We trust the good results obtained here may extend to other parts of the Province.

Bulletin Directions.

A little bulletin giving carefully prepared cultural directions for conducting the test, and a blank form upon which to report the results at the end of the season accompanied each lot of seed sent out. Many of the experimenters stated that the information given in the cultural directions would be of even more use to them than the experiment itself. However this may be, there is no doubt that the information given in the circular will be helpful to many in growing these various crops in future.

The cultural directions for each experiment are given herewith in connection with the various experiments.

Experiment with Beets.

The varieties distributed for this test were: Eclipse, Early Model, and Black Red Ball. The first is one of the old standard varieties which has long been known as one of the best, the other two are newer varieties of excellent quality, but not yet well known.

Cultural Directions.

1. Locate the plot for the experiment far enough away from buildings or trees that the crop may not be interfered with by shade or tree roots.
2. Select as nearly uniform soil as possible, and give the same treatment to each variety throughout the season.
3. Prepare the ground thoroughly, making a fine, mellow seed bed.
4. Mark out for sowing the seed, three parallel straight rows, 2 or 3 feet apart and 20 feet long.
5. The seed should be scattered evenly in the rows, about half an inch deep, and the soil should be firmed over the seed with hoe or rake.
6. For summer use the seed may be sown as soon as the ground is dry enough to work in the spring.
7. For winter storage, sow the seed the latter part of May, or first of June. The later sowing gives a better quality of beets for winter use.
8. Care should be taken to keep the varieties distinct and properly labelled. Wooden stakes, painted white, upon which the name can be written with a lead pencil, answer the purpose well. It is advisable also to make a record of the planting in a note book, in case a label should be lost.
9. Begin cultivation as soon as the plants appear above ground. Keep the ground well tilled to conserve soil moisture and stimulate growth of the crop.
10. Where a one-horse cultivator cannot be used, a wheel-hoe does good work, and is a great labor saver in the garden.
11. As soon as the plants are a couple of inches high, thin them out to two inches apart in the row. A hand-weeder is a great labor-saver at this work.
12. When the beets are about an inch and a half in diameter, begin to use them. Thinning out again so as to leave the beets for the main crop four inches apart.
13. At this time carefully weigh and record the weight of ten averaged-sized beets of each variety as dressed for boiling. In preparing the beets for boiling, do not cut off the leaves and roots too close to the main root, which causes loss of color in boiling.
14. Cook separately the samples of each variety and compare their quality.
15. Harvest the crop before it is injured by severe fall frosts. After weighing, store in moist sand or soil in a cool, moist cellar.
16. Carefully weigh and record the weight of ten average beets of each variety before storing.
17. Look over your report carefully and see that all of the particulars of the experiment are properly recorded. Make a copy of it to keep for future reference.
18. Kindly forward the report as soon as possible after harvesting the crop.

The Results.

Four hundred and forty-nine experimenters took part in this experiment. The results show that Eclipse was the favorite with the majority of the experimenters, as it matured the earliest and gave a good crop of fair quality. Early Model ranked second in popularity and Black Red Ball third, although many of the experimenters state that the latter was of better quality and finer appearance than either of the others. It is smaller and later in maturing.

Observations by Experimenters.

The following are some of the practical observations made by the experimenters with regard to their experience with this experiment:

J. L., Ashburn, Ontario County, who has had forty years' experience growing beets, says: "Your cultural directions will be of the greatest use to me in the future."

R. B. A., Kells, Nipissing District, who has had thirty years' experience, says: "I do not remember ever having had a better crop. I consider the Black Red Ball the best for table use."

J. McO., Ignace, Rainy River District, says: "You may know by this time that we had no summer in this district this year. I have learned the importance of keeping books and not planting until we have summer for sure, then keep the hoe going as often as possible."

A.W., Mt. Brydges, Middlesex County, who has had over thirty years' experience, says: "I never in my time have grown better beets. I think the seed you send must be better than we usually get at the country store."

J. B., Minden, Haliburton County, considers the Eclipse the best for his soil and locality, and says: "I will always get seed of that variety to plant, if possible."

J. W. W., Rodney, Elgin County, after fifteen years' experience, says: "We never had beets that were so tender. I have learned that in order to have good winter beets the sowing of the seed must be left until June as the spring sown beets get tough before fall."

S. M. O., Bracebridge, Muskoka District, says he has learned the importance of testing each variety by weighing and keeping a record of the results.

A. R., Hogan, Hastings County, says: "I think the Black Red Ball is the finest flavored beet we have ever used."

I. M. L., Solina, Durham County, says: "The dark beets like Black Red Ball sell best on the market and look best on the table."

W. C., Bruce Mines, Algoma, prefers Eclipse and says that the beets of the best quality do not always get the prize at the fall fairs, and that, as a rule, in his district the prize goes to the largest beet no matter what the quality.

In this connection, we may add that judges at fall fairs should consider the quality in judging garden vegetables, for it is not the largest roots that are of the best quality.

EXPERIMENTS WITH CARROTS.

The varieties distributed for this test were Chantenay, Danvers Half-long, and Rubicon. The first is one of the old standard varieties and the others newer varieties of good promise.

CULTURAL DIRECTIONS.

1. Locate the plot for the experiment far enough away from buildings or trees that the crop may not be interfered with by shade or tree roots.

2. Select as nearly uniform soil as possible, and give the same treatment to each variety throughout the season.
3. Prepare the ground thoroughly, making a fine, mellow seed bed.
4. Mark out for sowing the seed, three parallel straight rows, 2 to 3 feet apart and 20 feet long.
5. The seed should be scattered evenly in the rows, about half an inch deep, and the soil should be firmed over the seed with hoe or rake.
6. For summer use the seed may be sown as soon as the ground is dry enough to work in the spring.
7. For winter storage, sow the seed the latter part of May, or first of June. The later sowing gives a better quality of carrots for winter use.
8. Care should be taken to keep the varieties distinct and properly labelled. Wooden stakes, painted white, upon which the name can be written with a lead pencil, answer the purpose well. It is advisable also to make a record of the planting in a note book, in case a label should be lost.
9. Begin cultivation as soon as the plants appear above ground. Keep the ground well tilled to conserve soil moisture and stimulate a vigorous growth of the crop.
10. Where a one-horse cultivator cannot be used, a wheel-hoe does good work, and is a great labor saver in the garden.
11. As soon as the plants are a couple of inches high, thin them out to an inch and a half apart in the row. A hand-weeder is a great labor saver at this work.
12. When the carrots are about an inch in diameter, begin to use them. Thinning out again so as to leave the carrots for the main crop three inches apart.
13. At this time carefully weigh and record the weight of ten averaged-sized carrots of each variety without the tops.
14. Cook separately the samples of each variety and compare their quality.
15. Harvest the crop before it is injured by severe fall frosts. After weighing, store in moist sand or soil in a cool, moist cellar.
16. Carefully weigh and record the weight of ten average carrots of each variety before storing.
17. Look over your report carefully and see that all of the particulars of the experiment are properly recorded. Make a copy of it to keep for future reference.
18. Kindly forward the report as soon as possible after harvesting the crop.

The Results.

Three hundred and ninety-seven experimenters conducted the test with carrots. The reports sent in show that Chantenay was the favorite with the majority of the experimenters, because of its earliness, smoothness and good quality. Danvers Half-long, and Rubicon ranked in the order named and were highly spoken of by many of the experimenters.

Observations by Experimenters.

The following are some of the practical observations by experimenters.

M. B., Guelph, Wellington County, who never grew carrots before, says: "Taking care of the carrots will help me to grow other vegetables in the future."

T. M., The Pines, Lennox County, says: "I have learned the importance of early seeding, careful cultivation and proper attention to thinning out the crop."

R. T., Couttsville, Temiscaming District, says: "I have learned that carrots require more room than I have been accustomed to give them."

H. R., Harrisburg, Brant County, who has had ten years' experience in growing carrots, says: "I have learned that June sowing is better than early sowing for winter use."

A. B., Bruce Mines, Algoma, says: "From the seed sent I had seven bushels at harvest time. The Rubicon was the heaviest cropper, but I consider the Danvers best for quality."

I. B., Listowel, Perth County, who grew carrots this year for the first time, says: "By following your instructions, I obtained better results than my neighbors, for I got first prize at the North Perth Fair."

W. McK., Mitchell, Perth, who has had forty years' experience, says: "I never had a better crop of garden carrots. I took second prize at the Mitchell Show. The seed obtained from you was better than we usually get."

J. B., Woolverton, Oxford County, says: "We captured the red ticket for carrots at our Fall Show open to the world."

J. M., Utica, Ontario County, says: "This was my first attempt at growing carrots, and I do not see how I could improve on this year's crop. The carrots were ahead of any that old growers here have ever seen."

T. T. M., Acton, Halton County, who has had fifty years' experience, says: "All varieties did well. I never had as good a crop before. The seed was excellent."

G. R., Falconbridge, Middlesex, says: "I put Chantenay first. I do not think there is any better. I would like to get a pound of seed of this variety next year if possible."

Experiment with Lettuce.

The varieties sent out for the test with lettuce were, Black-seeded Simpson, Denver Market, and Hanson. These are a few of the best among ninety varieties which have been tested at the College during the past two years.

Cultural Directions.

1. Locate the plot for the experiment far enough away from buildings or trees that the crop may not be interfered with by shade or tree roots.
2. Select as nearly uniform soil as possible, and give the same treatment to each variety throughout the season.
3. Prepare the ground thoroughly, making a fine, mellow seed bed.
4. Mark out for sowing the seed, three parallel straight rows, 2 to 3 feet apart and 20 feet long.
5. The seed should be scattered evenly in the rows, about half an inch deep, and the soil should be firmed over the seed with hoe or rake.
6. For early use the seed may be sown as soon as the ground is dry enough to work in the spring.
7. For a succession of crisp, tender lettuce, a second sowing should be made a month later. If a second sowing is desired, sow only half of the seed of each variety at first, and keep the other half for the later sowing.
8. Care should be taken to keep the varieties distinct and properly labelled. Wooden stakes, painted white, upon which the name can be written with a lead pencil, answer the purpose well. It is advisable also to make a record of the planting in a note book, in case a label should be lost.
9. Begin cultivation as soon as the plants appear above ground. Keep the ground well tilled to conserve soil moisture and stimulate growth of the crop.
10. Where a one-horse cultivator cannot be used, a wheel-hoe does good work, and is a great labor saver in the garden.
11. As soon as the plants are a couple of inches high, thin them out to three inches apart in the row. A hand-weeder is a great labor saver at this work
12. Begin to use the lettuce as soon as the plants are large enough, thinning out each alternate plant, thus leaving the plants six inches apart.
13. When they begin to crowd at this distance, thin out again, leaving them one foot apart, at which distance they should form large, compact heads.
14. Carefully weigh and record the weight of four of the largest heads of each variety when full grown and in the best condition.
15. Look over your report carefully and see that all of the particulars of the experiment are properly recorded. Make a copy of it to keep for future reference.
16. Kindly forward the report as soon as possible after harvesting the crop.

The Result.

Two hundred and seventy-nine experimenters took part in the test with lettuce, and there was much diversity of opinion regarding choice of varieties. Most of them conceded Hanson to be the strongest growing and earliest maturing, but many thought the other varieties of better quality. For general popularity the varieties ranked in the following order: Hanson, Black-seeded Simpson, and Denver Market.

Observations by Experimenters.

The following practical observations were made by experimenters:

E.P., Denbigh, Addington County, says: "I have learned the importance of sowing as early as possible in the season. For my locality I put Hanson first and Black Seeded Simpson second.

E. K., Aylmer, Elgin County, who has had fifteen years' experience, puts Denver Market first and Black-seeded Simpson second. He says: "I have learned the importance of early planting and systematic thinning."

E. B., Ottawa, Carleton County, says: "I was greatly pleased with the results produced by following your instructions. Quite a number of the heads of all three varieties grew quite solid, and the inner leaves were very fine and tender."

C. L., Ridgemount, Welland County, says: "I have learned the importance of thinning at different times during the season to get the best results."

M. H., Baltimore, Northumberland County, says: "We found the lettuce most satisfactory, especially the Black-seeded Simpson. We used the lettuce through June, and July and part of August."

G. A. M., Carp, Carleton County, one of the school principals where school gardens have been adopted, says: "My children were delighted with the experiments, and followed your directions as closely as possible. We took $19.00 in prizes at the Fall Fair open to all. We had the best exhibit this year at the Carp and Huntley Fair. Hope you will again favor us with the opportunity of conducting experiments."

EXPERIMENTS WITH TOMATOES.

The varieties sent out for the test of tomatoes were Earliana, Success, and Stone. The first is one of the best early varieties, while the others are later maturing kinds of better quality.

CULTURAL DIRECTIONS.

1. If you have had experience in growing tomato plants, adopt what you have found to be the best methods of producing thrifty, stocky plants.
2. The seed should be sown about two months before the time the weather usually becomes warm enough for planting in the open, from the first of March to the first of April, depending upon locality.
3. The plants are best started in a greenhouse. Failing this, they may be started in a hot bed or window boxes in a warm room.
4. When the plants have their second pair of leaves, they should be transplanted into good soil in a hot bed, or plant boxes, setting them 3 or 4 inches apart.
5. Give them all the sunlight possible, water carefully, and guard them against frost or cold drafts.
6. As soon as danger of frost is past, the plants should be planted in the field from 4 to 5 feet apart each way.
7. Locate the plantation far enough away from buildings or trees that the growth may not be interfered with by shade or tree roots.
8. Set out as many plants as you choose, but six good plants of each variety should be selected and marked from which to record the yields for your report.
9. Care should be taken to keep the varieties distinct and properly labelled. Wooden stakes, painted white, upon which the name can be written plainly with a lead pencil, answer the purpose well. It is advisable also to make a record of the planting in a note book, in case a label should be lost.

10. Give good cultivation in order to maintain a loose earth mulch on the soil, which holds soil moisture and stimulates vigorous growth. The tomato plant responds readily to good cultivation.

11. When the plants begin to make heavy growths, spread the branches out in all directions and keep them near the ground so they will get all the sun and the earth heat possible.

12. Carefully weigh and record the weight of each picking, so that you may be able to report the total crop at the end of the season.

13. Look over your report carefully and see that all of the particulars of the experiment are properly recorded. Make a copy of it to keep for future reference.

14. Kindly forward the report as soon as possible after the last picking.

The Results.

This experiment was conducted by three hundred and fifty-six experimenters scattered all over the Province.

As the tomato requires a long, warm season to mature a full crop, naturally the results with this experiment depend largely upon the season and the locality. In northern sections of the Province where the seasons are shorter, only the earliest varieties can be brought to maturity, and in a cool season, like the one we have just had, even the earliest kinds do not always ripen. Earliana being one of the earliest varieties, naturally gave the best results this year in most sections of the Province. In southern sections, however, where tomatoes are largely grown, the Success and Stone, which are much later and of better quality, are the favorite varieties.

Observations by Experimenters.

The following practical observations are made by experimenters:

G. W. T., Hespeler, Waterloo County, says: "I have learned the importance of getting the plants started in good time with a sturdy, vigorous growth before planting outside."

C. B., Aultsville, Dundas County, who has had ten years' experience, considers Earliana the best for that district, and says, with him this experiment has introduced a variety of superior quality.

R. Y., Waubuno, Lambton County, says: "In ordinary seasons the Stone is the best tomato for this district, but Earliana is the best for a season such as we have just had."

G. M., Salsbury, Bruce County, says: "We have never weighed the crop before, and I think it gives a better idea of what the varieties really do."

W. F. E., Silverwater, Manitoulin Island, who has ten years' experience, says: "I have learned the importance of transplanting two or three times to make the plants stalky, and that more fruit ripens if the plants are kept near the ground."

S. E. R., Minden, Haliburton County, who has had ten years' experience, says: "Earliana is the best variety for this section, but even it did not ripen on the plants. I ripened most of the crop in the house after it was picked."

R. E. H., Dunnville, Haldimand County, prefers Success for his district but adds that, "Taking one year with another, the early varieties are the best; for, while they do not yield with the later kinds, the entire crop ripens before frost comes."

W. E. T., Bedford Park, York County, says: "Earliana is the most profitable variety for market."

W. L., Blue Lake, Brant County, says: "The Earliana tomatoes are smooth and of good quality and ripened when price was best on the market. I have saved seed from some of the best and earliest fruits."

E. B., Sarnia, Lambton County, says: "We had a good crop of tomatoes. The Earliana was the most profitable variety with us, as we ship all our crop to the upper lake ports, and they are ready much earlier than the other sorts. In our experiment we could not see much difference between Stone and Success. I intend to try these two sorts on a larger scale next year. The Earliana is valuable on account of its earliness, but its quality is not of the best, and it does not take on the market when the other better sorts are ready."

EXPERIMENTS IN FRUIT GROWING.

In presenting a report upon the co-operative experiments in fruit growing, I am pleased to say that more has been accomplished this year than ever before. From the small beginning made fourteen years ago with sixty experimenters, we now have over five thousand experimenters engaged in this work. This year alone plants were sent to twenty-three hundred and ninety-two experimenters. These experiments are now being conducted in every county and district of the Province, and I am pleased to note that they are most eagerly taken up in those districts where fruit is not largely grown. In this way the work is reaching those who need it most.

Plan of Distribution.

Early in the year an announcement is made in all of the leading papers of the Province and a circular is also sent to all of the previous experimenters who have duly reported on the material sent them, that plants will be sent by mail, free of charge, for testing, on the understanding that those who receive them will follow the directions furnished and report results at the end of each season as requested.

The trees and plants for these experiments are purchased from nurserymen who make a specialty of growing good stock and putting it up in good condition for distribution by mail. We are obliged to make use of the mail because in many cases experimenters live so far away from express offices or railroads that it would be impracticable to reach them in any other way.

Records Kept.

A record is kept in our office giving the name and address of each experimenter, the kind of plants sent him for testing, and a brief record is made each year of his report upon the same. Naturally, some of the experimenters for one cause or another fail to keep their promise and report the results. Some drop out after two or three years, and there are many who have been engaged in this work almost from the beginning and have been sending in regular reports. In this way we have a list of careful experimenters all over the Province, the results of whose experiments are not only of value to us, but to themselves and the neighborhood in which they live.

Plants Distributed for Testing in 1907.

The following is a list of the experiments offered in the spring of 1907. This list shows the various classes and varieties of each offered for testing. The varieties selected make a good general collection for home use, and in most cases cover the season from early to late. They have been selected after years of careful testing in our experimental plots here and at the various Fruit Experiment Stations throughout the Province, as the ones most likely to give good results throughout the country.

No. 1. *Strawberries.*—Splendid, Fountain, Ruby, and Parsons—12 plants of each.

No. 2. *Raspberries.*—Cuthbert, Golden Queen, Marlboro', and Columbian—6 plants of each.

No. 3. *Black Raspberries.*—Gregg, Kansas, Palmer, and Older—6 plants of each.

No. 4. *Blackberries.*—(Adapted only to *Southern sections of Ontario) Agawam, Eldorado, Kittatinny, and Snyder—6 plants of each.

No. 5. *Currants.*—Fay, Red Cross, Victoria, and White Grape—2 plants of each.

No. 6. *Black Currants.*—Champion, Lees, Naples, and Black Victoria—2 plants of each.

No. 7. *Gooseberries.*—Downing, Pearl, Red Jacket, and Whitesmith—2 plants of each.

No. 8. *Grapes.*—(For *Southern Ontario) Concord, Wilder, Niagara, Lindley, Brighton, and Vergennes—1 vine of each.

No. 9. *Grapes.*—(For *Northern Ontario) Champion, Worden, Winchell, Delaware, Lindley, and Moyer—1 vine of each.

No. 10. *Apples.*—(For *Southern Ontario) Primate, Gravenstein, McIntosh, Blenheim, Rhode Island Greening, and Northern Spy—1 tree of each.

No. 11. *Apples*—(For *Northern Ontario) Transparent, Duchess, Wealthy, McIntosh, Scott's Winter, and Hyslop Crab—1 tree of each.

CULTURAL DIRECTIONS.

A little bulletin of carefully prepared cultural directions is sent to each experimenter giving full directions for conducting the experiment with the kind of fruit sent him for testing. In many cases experimenters report that these directions are of great value to them, not only in the care of the particular fruit sent, but for the care of other fruits which they are growing. As these directions were printed in full in our last annual report they need not be repeated at this time. Copies may be had from us any time upon application.

CONDITIONS FOR PLANTING.

The past season was, in many respects, rather unfavorable for the planting of nursery stock. The spring opened up very late and was cold and backward. In many parts of the Province there was extreme drought during the summer. For this reason experimenters have not had as good results with their planting as usual. Some report entire loss of plants, but the majority have succeeded in saving a few plants of each variety. With most of the fruits, they are then soon able to propagate more for themselves, and can conduct the test on a larger scale with plants of their own growing, and in such cases the results are always more satisfactory than with plants received from a distance.

EXPERIMENT NO. 1, STRAWBERRIES.

During the past fourteen years strawberry plants have been sent to 2.128 experimenters. This year plants were sent to 713 experimenters. The list of varieties of strawberries sent out has varied from year to year, in order to include the best of the new varieties which appear from time to time. Over four hundred varieties of strawberries have been tested in the experimental plots at the College during the past fourteen years, and it has been found that the older varieties gradually run out and are being superseded by newer and better kinds. The varieties distributed this year were, Splendid, Fountain, Ruby, and Parson's Beauty. Results upon the fruiting of these will not be received until next year. The varieties distributed last year were, Splendid, Clyde, Tennesee, and Irene. The reports upon these show that Clyde and Tennesee have been the heaviest yielders, but as neither of these are of the best quality, being too light in color and not firm enough in texture, it has been thought best to replace them by Ruby and Parson's Beauty, varieties of better color and quality. Splendid has given excellent results as an early variety and Irene has done well as a late one.

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*This division of the Province into North and South may be approximately made by a line running from Collingwood to Kingston.

In the cultural directions furnished to experimenters, it is recommended that a new plantation be set out each spring with plants from the plantation set the year before, that they receive good cultivation, and not be allowed to fruit the first season. In the fall after the ground is frozen hard, plants should be covered with strawy manure for winter protection. On the whole, it is better to take out one crop from the plantation than attempt to fruit it for two years.

EXPERIMENT NO. 2, RASPBERRIES.

Plants for this experiment were sent this year to two hundred and six experimenters. In all, six hundred and ninety-one experimenters have taken up this experiment. The varieties distributed for testing have been Marlboro,' Cuthbert, Golden Queen, and Columbian. These have been selected as a desirable collection for home use, covering the season from early to late, and should hardly be compared in point of yield. Marlboro' is one of the best early red varieties. Cuthbert is the leading variety for main crop and one of the best quality. Golden Queen is practically a yellow Cuthbert and is one of the best yellow varieties. Columbian is one of the purple cane varieties and produces purple colored fruit. By many experimenters it is reported as the most productive of the lot and by some is preferred for home use, although the fruit is not, as a rule, so attractive nor rich in quality as that of Cuthbert.

EXPERIMENT NO. 3, BLACK RASPBERRIES.

Plants were sent this year to one hundred and eighty-five experimenters, and six hundred and thirty-one have received plants for this experiment within the past fourteen years. The varieties distributed for several years past have been Gregg, Kansas, Palmer, and Souhegan. This year Souhegan was dropped from the list and Older substituted. The Older has proved to be one of the hardiest of the black raspberries. It has been included in the test with the expectation that it will succeed where most of the other varieties have proved too tender. Gregg has given the best results in southern sections of the Province where it is more or less extensively grown. Kansas and Palmer rank next in the order named, and have succeeded farther north than Gregg, but neither of them is equal to it in quality or in size of berry.

EXPERIMENT NO. 4, BLACKBERRIES.

Seventy-two lots of blackberries were distributed this year, and four hundred and seventeen have been sent out during the past twelve years. The varieties distributed were Agawam, Eldorado, Kittatinny, and Snyder. Blackberries are the least hardy of any of our bush fruits, and for this reason we mention in our list that they are adapted only to southern sections of the

Province. Agawam and Eldorado have proven to be the hardiest and have succeeded farther north than the other varieties. Kittatinny is still the favorite in southern sections of the Province and is one of the best where it succeeds.

EXPERIMENT NO. 5, CURRANTS.

Currant bushes were distributed to eighty-five experimenters this spring, and four hundred and sixty-eight experimenters have taken up this experiment during the past fourteen years. The varieties included in this test are Fay, Red Cross, Victoria, and White Grape. Fay has been the favorite with many experimenters because of its extra large fine fruit. Red Cross and Victoria have in many cases given heavier yields, and by some are preferred because of their extra productiveness. The White Grape currant is one of the best of the white currants, and in many cases has proved to be the heaviest cropper on the list. For home use this is one of the best of the currants, but for market the white varieties are not so much in general favor as the reds.

EXPERIMENT NO. 6, BLACK CURRANTS.

Plants were sent this year to one hundred and ten experimenters. Three hundred and three experimenters now have plants of these under test. The varieties sent out for this experiment were, Champion, Lees, Naples, and Black Victoria. Reports from experimenters vary considerably regarding results with these varieties. In some cases Champion and Lees have given the heaviest yields, but nearly all experimenters concede that Black Victoria is one of the largest fruited varieties in the test. The currants are among the hardiest of our bush fruits and succeed in all parts of the country. Some of the best yields are reported from Muskoka and Algoma, where some of the more tender fruits do not succeed.

EXPERIMENT NO. 7, GOOSEBERRIES.

Gooseberry bushes were sent this year to one hundred and thirty-seven experimenters. Six hundred and seventy-four experimenters have now received plants for this test. The varieties distributed have been Pearl, Downing, Red Jacket, and Whitesmith. The majority of the experimenters report Pearl as the heaviest yielder, with Downing and Red Jacket ranking in the order named. All of these are of the American type of gooseberry, and are more or less exempt from attacks of mildew, to which Whitesmith, which is one of the European varieties, is subject. Wherever Whitesmith can be grown, free from mildew, however, it is one of the best varieties because of its extra large fine fruit.

EXPERIMENTS NOS. 8 AND 9, GRAPES.

Grape vines for co-operative testing were sent out last year for the first time. Four hundred and twenty-four lots have now been distributed, two hundred and seventy-four of which were sent out this year. As grape vines do not usually come into bearing until two or three years from time of planting we do not look for report on yields this year. As only the earlier varieties of grapes can be matured in the northern sections of the Province, two separate lists of varieties were offered, one for northern and one for southern Ontario. The northern list includes, Champion, Worden, Winchell, Delaware, Lindley, and Moyer, a few of the best early varieties of each color. The southern list includes Concord, Wilder, Niagara, Brighton, Lindley, and Vergennes. These are among the best varieties of the various colors, but not to be depended upon to ripen in northern sections of the country where the seasons are shorter and vines have to be laid down for winter protection.

EXPERIMENT NOS. 10 AND 11, APPLES.

Apples were sent out for the first time last year. One thousand and eighteen experimenters have taken up these experiments, six hundred and ten lots being sent out this year. In making a selection of apples, the climatic conditions of the northern and southern sections have also to be considered. Those selected for the southern sections were Primate, Gravenstein, McIntosh, Blenheim, Rhode Island Greening, and Northern Spy. This makes an excellent selection of varieties for home use to cover the season from the earliest to the latest. For the northern section the list includes only the hardiest varieties which will be most likely to succeed where winter conditions are severe. These are Transparent, Duchess, Wealthy, McIntosh, Scott's Winter, and Hyslop Crab.

In order to send these trees by mail, it is necessary to send one year old trees which can be conveniently sent through the mails. Some of the experimenters have thought these were too small for planting in regular orchard and were advised to plant them in a nursery row for a year or two until they reach the regular size for orchard planting. These small trees, however, have the advantage in northern sections in that they can be headed down to within a foot of the ground and made to form low heads, which are less liable to injury from sunscald, one of the most troublesome injuries in northern sections. The majority of the experimenters report that the trees arrived in good condition and have done well considering the trying season. From the varieties sent, experimenters may select scions to graft into bearing trees and thus obtain fruit a few years earlier than waiting for the little trees to come into bearing. No report of fruiting from these can, of course, be expected for some years to come.

Conclusions.

In concluding this report, we may say that we are pleased with the progress which experimenters are making as evidenced by the reports sent in. As the work has an educational as well as a practical value, the greatest good from it naturally accrues to the experimenters who receive the plants, follow the directions, and carefully conduct the experiments. We are pleased to hear from many experimenters that their small plantations have become centres for distribution of plants to neighbors who have not been growing fruit. In this way the value of the work is extending, and we trust before long that there will not be a country home in this province that will not have its supply of fruits, at least for home use if not for market.

Mr. HYATT: Are those directions for growing tomatoes, for commercial or for fancy growing?

Prof. HUTT: More for home use. What is the point you desire to make?

Mr. HYATT: It won't work out for commercial growing.

Mr. JARVIS: I came up here to carry back some of the good things which you have to offer in such abundance, rather than to contribute to the programme, and I have been very much interested in the paper which has been presented. Although, I believe it is presumption on my part to comment upon it, yet one thing appeals to me, and that is the School Garden idea, which has been introduced in this experimental work. I think it is a very commendable and unique idea, and worthy of elaboration.

In the vegetable work, the question of variety is one which is regulated largely by the use which it is intended to make of the crop, for there are different types of vegetables. It is not well to compare the varieties of vegetables, because the purposes for which they are intended are so varied. No doubt this paper will stimulate the experimental spirit, and will acquaint the grower with varieties, with which he is not familiar.

I think a line of experimenting in fertilizers might be taken up in co-operative work. I have conducted some experiments of this kind myself, during the past year, using different fertilizers, and putting them on at different times and seasons. That is something we have over-looked to a great extent. We had difficulty in growing cauliflower successfully in Connecticut, and I took up the cauliflower experiment last year, and made applications of different fertilizers and of combinations of fertilizers, and I did not get such a very great difference from the different kinds of fertilizers, as I did from the time of application. It has been believed that nitrogenous fertilizers applied late in the season to cauliflowers, would have an injurious effect, by producing too much leaf-growth, rather than compact growth, but this was not the case. Nitrogenous fertilizers applied just about the time the cauliflower was beginning to head, produced wonderful results, and by that treatment, we had the only good crop of cauliflowers we have ever been able to grow on the College grounds. I throw that out as a suggestion to show that there is a great field for investigation, as to the time of application of fertilizers.

I have been told that by using phosphoric acid, tomatoes may be matured from eight to fifteen days earlier. That is an important thing in our State. We have found we cannot use too much phosphoric acid in tomato growing.

Another feature that is important, is co-operation in the different methods of growing—the trellis system, the pole system, the single stem system, or letting them grow as they will. We have found that it is a good thing to grow tomatoes with particularly long stems. Lay it down and cover about a foot of it with soil, and you can develop the root growth twice the size that you will under ordinary conditions. With the roots coming out from the bottom of the stem, it is wonderful the amount of root-surface you can get. Our tomatoes set out in this way last year, were away ahead of anything else.

The question of rotation in vegetables could be very easily taken up. One of our leading growers in Connecticut, who tests all the new varieties in vegetables, grew fifteen different varieties of cabbage last year, and as many varieties of cauliflowers, and several new varieties of tomatoes. He grew one row of each, right through his garden. One-half of his plot was planted with beans the year before, and the other half with turnips, and there was a very marked difference in some particular kinds of vegetables. Some do far better where turnips were grown, and other kinds do better where beans were grown previously, and that was a lesson to me. I think it is one that we might all keep in mind.

We had trouble in maturing melons and squash last season. We were unable to mature the Hubbard squash under ordinary methods of growing. It was an adverse season. I think we can produce a variety of squash that will mature earlier, so as to avoid so great a loss. We have a cross between the Hubbard and the Marrow, which is very promising. It matures ten days to two weeks earlier than the Hubbard. I thank you for your attention. (Applause).

THE CHAIRMAN: I am sure we feel greatly indebted to Mr. Jarvis for the information he has given us, on the growing of these valuable crops.

MR. HYATT: We engage quite extensively in tomato growing in Prince Edward county. We grow them for commercial purposes, and it means to us something enormous. Our friend here has given us some very good ideas for fancy growing, but when he comes down to commercial growing, he is not in it. You have to be careful in your selection, and have got to consider the appearance of the plant, flesh, and cultivation. It would take me an hour or two to give the whole system, to tell you the proper planting time, how to make a hot-bed and a cold-bed, and give you the reasons for it. I am pleased with what I have heard. It has been very instructive. You could not train them up if you were growing them for commercial purposes. We find that where their branches strike the ground, they will take root. One more important thing in cultivation, is to see that you have no root threads on the cultivator. Cutting the roots in this way is a check to the crop.

A MEMBER: The demand for the White Currant exceeds the supply in the Toronto market, and the people seem to have neglected to grow it.

MR. HUTT: Where the market will take it, it will pay to go into it, because it will grow a greater crop than any other currant.

A MEMBER: I would like to ask Professor Hutt what is the best late strawberry for the main crop?

Prof. HUTT: Splendid, is our best early and for late Ruby and Parsons Beauty. In growing strawberries I would not want to be confined to less than four varieties.

Q.—Have you had Midnight?

A.—Yes; it is not a bad berry, but it does not yield enough. We have tested 400 kinds.

NAMING THE FARM.

MR. G. C. CREELMAN, PRESIDENT, AGRICULTURAL COLLEGE, GUELPH.

In a ten-minute talk I think it better to confine myself entirely to one small subject and I have chosen to say a few words to you to-day on "Naming the Farm." In this country there is such a decided tendency among farmers to leave the home place to strangers and to move to the towns and cities in declining years, that no distinctive home feeling attaches itself to many of our places. It is usually a question of, "How much can I get for the farm?" not, "Into whose hands may it pass?" The result is that as the young people leave home and go over into another township, another county, or into one of our large cities, they cannot return at Thanksgiving or Christmas to the farm upon which they were born or upon which they spent their childhood days.

I believe, therefore, that if our good farmers were to seriously decide upon a proper name for the farm and then keep the farm up to the name, it might lead to more permanent occupation and incidently serve to keep at least one of the best boys at home on the farm, with the hope of succeeding to the management of it fairly early in life.

The following are some of the reasons I would give why our farms should be named:

(1) Because all of our Provincial Ministers of Agriculture have done it, and the farms of each are incidentally a credit to the entire Province.

(2) Each of these Ministers has but one son, and all of these boys are still on the old home farms, and in two instances out of three have entire management of the place. The same, no doubt, will be true of the son of the present Minister of Agriculture when he becomes old enough.

(3) I believe it would mean better farming. No man could afford to place a good name upon a poorly farmed homestead. He would soon be the laughing stock of the country. On the other hand, he would want to live up to the name, in order that his immediate family and his neighbors might see what a good farmer he was.

(4) It would mean better buildings, which would be kept painted and in good repair and would present a good appearance from both outside and inside.

(5) It would mean a tidier place, as it would be constantly in the public eye, people would be talking about it, and untidiness of any kind would appear so glaring as to be quite out of place.

(6) The habit of tidiness and good farming leads to thrift, so that a man whose farm was well named would soon come to be a more prosperous farmer.

(7) When the place became well known, such a farmer would have no difficulty in disposing of his surplus stock or other farm produce, as he would be receiving the very best kind of advertising from his neighbors and others, who knew him to be thoroughgoing in all his farm operations.

How to Start.

I would suggest to all the young men present to-day that they take this matter into their serious consideration, and if any one decides now that he will during the Christmas vacation talk this matter over with his parents, I would suggest that the next step be that he present his father or mother with 500 or 1,000 sheets of first-class letter paper, upon which has been printed the new name of the old farm. This would be a start in the right direction and in a business way.

We are independent just as we make ourselves comfortable and happy, and we cannot possibly be independent in thought, in word, or in deed, if the things around us are in a disreputable condition and we are constantly behind in our work. Life is not worth living with the fences down, buildings unpainted, and in bad repair, weeds everywhere, and stone piles left in the field to be plowed around and harrowed around and mowed around generation after generation. Implements left out or jumbled all together in the corner of a driving shed is bad business from any standpoint; hence I make a strong appeal to you to name your farms and to live up to the name.

RESULTS OF CO-OPERATIVE EXPERIMENTS WITH FERTILIZERS IN SWAMP SOILS.

By Prof. R. Harcourt, Agricultural College, Guelph.

Swamps are, generally speaking, low lying areas, ponds, arms of lakes, etc., in which aquatic plants have lived and died and where the accumulations of this organic matter have gradually risen to the surface of the water and upon which vegetation of various kinds has developed. When these areas are drained, a mass of organic matter in different stages of decomposition and varying in thickness from a few inches to many feet is left. This is what constitutes the original swamp soils. When the accumulation of organic matter is deep, there is apt to be poor aeration, low temperature, high acidity, and, consequently, poor nitrification. It is therefore, possible that in such soils, rich in nitrogen as they always are, there may be very little nitrogen in a form that plants can assimilate. These soils are also usually deficient in potash, although they frequently contain large quantities of lime and magnesia and about the normal amount, or a little less, of phosphoric acid.

On the other hand, where a certain amount of sediment from the surrounding uplands is mixed with the organic matter during the filling-up process, and when the temperature is more favorable, bacterial action is active and the organic matter decays rapidly. Such soils are naturally less acid and contain more potash and other mineral matter and may be brought into a productive condition very much more quickly than the deposit in a deeper and colder swamp. In Ontario to-day many of these swamp areas may be seen in various stages of the filling-up process, and much soil formed in this way is being drained and brought under cultivation with, as might be expected, varying results.

It has been found that, generally speaking, where the original growth of the swamp was tamarack or black spruce, the soil is unproductive. Swamp soil lying over sand is almost always reported as producing unsatisfactory yields, but when the subsoil is clay, especially when some of it is mixed with the top soil, the yields are usually excellent. As a rule, where the organic matter is deep, the crop returns are poor.

The object of our experiments was to co-operate with the owners of such soils to ascertain whether the application of lime, potash, and phosphoric acid would increase the productiveness of their particular soil. As it was impossible for us to make an examination of every soil before placing the experiments, we naturally have got quite varying results. Some experiments were placed on swamp land that had given good results; others were placed on swamp land in which the organic matter was not sufficiently decomposed to hold moisture or supply plant food; and still others were on soil that was insufficiently drained and wet weather destroyed the crop. We are glad, however, to report that in many cases the fertilizers used improved the crop and apparently made up for the deficiencies of the soil.

A general outline of the plan of the experiments and the results obtained are as follows:

EXPERIMENT 1, WITH CORN: The plots were one-tenth acre in size and were fertilized as follows:

Plot No. 1 . . . . 200 pounds of muriate of potash per acre.
" 2 } . . . . . . 200 " " " "
" 2 } . . . . . . 400 " Thomas phosphate "
" 3 . . . . No fertilizers.

Six experimenters took fertilizers, and four gave complete reports.

The results are as follows:

Yield per acre.	Plot No. 1.	Plot No. 2.	Plot No. 3.
	Lbs.	Lbs.	Lbs.
Report 1—Weight of corn on cob	5,140	4,900	4,650
" 2 " " "	2,730	3,790	2,400
" 3 " " "	2,790	3,320	2,160
" 4 " " "	2,780	2,920	1,400

It will be noticed that in every case the potash used on Plot No. 1 increased the yield more or less, and that in three out of the four experiments the use of Thomas phosphate still further increased the weight of corn. In all cases, but especially in Report No. 4, the size of the cobs and the quality of the corn was very much improved.

Experiment II. with Oats: The plots were 1 x 2 rods, or one-eightieth of an acre, in size and the fertilizers were applied at the same rate as for corn. The following are the returns received:

	Yield per acre.	*Plot No.* 1.	*Plot No.* 2.	*Plot No.* 3.
Report 1.	Straw and Grain, lbs.	6,400	10,000	4,000
	Grain, bushels	30.6	40.0	23.5
" 2.	Straw and Grain, lbs.	2,880	2,560	2,160
	Grain, bushels	65.9	54.1	40.0
" 3.	Straw and Grain, lbs.	2,240	2,160	1,680
	Grain, bushels	47.0	44.7	34.1
" 4.	Straw and Grain, lbs.	1,840	2,480	1,600
	Grain, bushels	21.2	37.6	16.4

The first report was of results on a swamp soil which produced very rank straw, and here both the potash and phosphoric acid produced good results. The next two reports show larger returns for potash alone than for potash and phosphoric acid, although it is hard to see why the latter substance should have injuriously affected the results. All of these experimenters reported that there was a marked difference in color and general appearance of the grain on the different plots, a difference so great that it could be seen as far as the plots could be distinguished.

Experiment III. This experiment was planned to ascertain the influence of lime on these soils, and was the same as No. II., with the exception that one plot received lime alone and that it was used also with the potash and phosphoric acid. The plots were, therefore, arranged as follows:

Plot No. 1......2,400 pounds of lime per acre.
" 2......2,400 " "
200 " muriate of potash per acre.
" 3......2,400 " lime per acre.
200 " muriate of potash per acre.
400 " Thomas phosphate "
" 4......No fertilizers.

The wet, cold weather of the early spring, and midsummer frosts were responsible for a large percentage of the failures. However, 10 out of 20 experimenters sent in complete results. These are as follows:

	Yield per acre.	*Plot No.* 1.	*Plot No.* 2.	*Plot No.* 3.	*Plot No.* 4.
Report 1.	Straw and Grain, lbs.	...	...	...	...
	Grain, bushels	20.7	17.7	19.5	14.7
" 2.	Straw and grain, lbs.	1,480	1,620	1,700	1,360
	Grain, bushels	...	...	...	...
" 3.	Straw and Grain, lbs.	4,600	5,160	5,120	4,120
	Grain, bushels	...	...	...	...
" 4.	Straw and Grain, lbs.	3,760	4,400	4,000	4,440
	Grain, bushels	35.3	43.5	38.8	42.3
" 5.	Straw and Grain, lbs.	...	...	...	...
	Grain, bushels	13.0	13.0	19.0	10.0
" 6.	Straw and Grain, lbs.		...	...	...
	Grain, bushels	17.0	28.2	30.6	19.4

Report 7. Straw and Grain, lbs	2,080	2,730	2,520	2,240
Grain, bushels	23.5	26.0	24.7	23.5
" 8. Straw and Grain, lbs.	2,960	3,240	2,520	1,640
Grain, bushels	21.2	24.7	19.0	13.5
" 9. Straw and Grain, lbs.	2,880	4,480	4,880	2,800
Grain, bushels	30.8	44.7	47.0	25.9
" 10. Straw and Grain, lbs.	2,160	2,320	2,240	...
Grain, bushels	21.2	23.5	21.2	...

A study of the figures indicates that in the majority of cases lime gave decidely beneficial results, and that potash and phosphoric acid may be used on some of these soils to increase the yields. It should be borne in mind that these soils differ so widely, in composition, in stage of the decomposition of the organic matter, amount of mineral matter present, etc., that because one soil fails to respond to the use of lime of the fertilizers it is no reason why another should not. Furthermore, it may be pointed out that the full effects of the fertilizers will not be got the first year. Two hundred pounds of muriate of potash per acre for oats is about five times as much as will be taken from the soil by one crop, and in most cases the balance will be retained by the soil in a form readily available for succeeding crops. This is borne out by statements from experimenters to the effect that the appearance of the second crop on the fertilized ground was much superior to the rest of the field. In conclusion, I may say that we shall be glad to communicate with anyone having difficulty in securing paying crops on well drained swamp lands.

A Member: Were these plots tile drained?

Prof. Harcourt: No, I do not think any of them were drained. That has been the fault in some cases, for the soil was so new that the material leached out of it.

A Member: What effect do you think barnyard manure would have on these swamp soils?

Prof. Harcourt: We have not tried barnyard manure, but in correspondence with men who have swamp soils, I have found in a number of cases that they have used it with good effect. Barnyard manure is richer in nitrogenous matter than anything else. It seems like carrying coals to Newcastle, to put barnyard manure on swamp soils. It seems to me that the good effect that is got from barnyard manure is largely due to its containing germs that go with barnyard manure. Small dressings and frequent are better than large applications.

A Member: Last year, I experimented with phosphates on a barley field; the soil was thoroughly drained. It had no effect whatever.

Prof. Harcourt: In many cases, these swamp soils are deficient in potash, and until this is made good they are not productive.

FARMING WITH A DEFINITE OBJECT IN VIEW.

By Mr. G. A. Putnam, Superintendent of Farmers' Institutes, Toronto.

It is a great pleasure for me in my capacity of Superintendent of Farmers' Institutes, and also as an ex-student, to meet with the students and ex-students, and those who are connected with this Experimental Union as experimenters. I am sure it is a great pleasure to meet you here and to join with you in talking over the work of the past year and making plans for the future. There is just a danger that some of us might allow the pleasure of the occasion to interfere with the profit. It really is a grand occasion for each of us to return here and meet with old friends, but we must not overlook the fact that it is a time when we can improve our agricultural information. We, who were students here some years ago are inclined to envy the students at the college at the present time. True, some of the old men, such as Mr. Zavitz and Mr. Mason, have won distinction along agricultural lines, but still I think some of us envy the students of the present day, who can claim they are of the body who have obtained some distinction in the judging contest in Chicago.

We might, at this time, ask ourselves what the Experimental Union means. It is an occasion when we meet together for the purpose of learning what has been done during the past year. I always like to meet with a student who has some one or more ideas which he intends to carry out, when he gets back to his farm. If you meet a student who says he has certain plans to carry out when he gets back on his farm, you can generally look to that student and find him attaining success when he goes back. I have in mind one student who, when he came here, was very deficient in education, and having no money of his own, he borrowed $50 in order to come to the College, and now he is getting $5,000 a year and his expenses, and the expenses not only of himself, but his wife and family. His success was due to the fact that he had one idea in mind, and he carried that idea through when he left the College.

It is a great pleasure for me, in going from place to place in the Province, to learn of the success which some of the ex-students have attained. I have in mind a student in Eastern Ontario, who, after he went home, adopted a very crude method of attempting to improve the average production of the cows in his herd, but at the end of ten or twelve years, working in co-operation with his father, he succeeded in increasing the average production of that herd 100 pounds of butter fat in a year, which would mean an increase of $900. He has not stopped at that, but says he can make an increase of 100 pounds more, and he is trying to do it.

I wish to ask the ex-students this morning, "What are you doing in your own locality or on your own farm?" There is no reason why every ex-student should not take a definite line of work. If there is not some definite line of work that you can take, what good was your course at the Agricultural College?

We have the regular Institute meetings, and the Special Fruit meetings, and the Dairymen's Association meetings, and there are any amount of opportunities through which you can do good work. I wish to impress upon you the advisability of undertaking some definite line of study after you go home. Form some kind of local organization. If you have no organization whereby you are able to follow up agricultural advantages, get to work and form a Farmers' Institute Club, or a Farmers' Institute whereby the farmers of the locality can come together and study. What can you hope to accomplish with an isolated meeting once a year? You must be able to apply general principles to local conditions, you cannot have one speech for all localities. We are planning in the Department of Agriculture to encourage the formation of Farmers' Institute Clubs. I secured the consent of the Minister a few days ago to give more encouragement to these clubs. These clubs, which hold at least four meetings a year, will be given a speaker upon whatever special line they want. That is in addition to the Institute meetings. It will be free of cost to that club, and if we have any literature in the Department, which is not in sufficient quantities to distribute to all, then these clubs will get the preference of this literature. I wish to warn you against despising the small Institute meeting, or the small Club. While

I enjoy meeting with the ex-students at the Union meeting, and while I enjoy meeting with the leading dairymen of the Province, at the annual meeting of the Dairymen's Association, I believe I have the greatest pleasure when visiting the small Institute meeting away off in the back districts. The other day I had the pleasure of visiting an Institute at Mono Mills, a place where they had never had an Institute meeting before. They organized a Farmers' Club there last winter. One of the leading men had attended an Institute meeting at Orangeville, and he went home and organized a Club, and they derived more benefit from that Club last year than the adjoining place derived from their regular Institute meetings in three or four years, and it was the most enjoyable Institute meeting I have ever visited. I mention these facts to encourage the students when they go back home, to form these local organizations. Where you have a Woman's Institute, have the women and the men hold joint meetings.

I trust you will take advantage of these few hints. When you go home, make an effort to form these Clubs or adopt some means whereby the farmers of the locality may have an opportunity of studying together and co-operating. (Applause.)

The CHAIRMAN: Mr. Putnam has thrown out some valuable hints and I think he struck the key-note of one of the present needs of Canadian agriculture when he spoke of the organization of Farmers' Clubs. I believe the most pressing need of the farmers of the whole of Canada to-day is organization, and I think there is a great work that may be done. These Farmers' Clubs will work out a great future for the farmers of Ontario.

REPORT ON FARM FORESTRY IN ONTARIO FOR 1907.

BY E. J. ZAVITZ, ONTARIO AGRICULTURAL COLLEGE, GUELPH.

Owing to the long time element in growing and harvesting a forest crop, an annual report on the subject may bring forth little of new interest. It may be possible within a decade to entirely change the type of hog in the Province of Ontario, but the improvement of forest conditions must naturally take a longer period. We find that even in Germany where scientific forestry has been practiced for nearly two hundred years, that to-day the private woodland is often badly managed. I venture to state that in Ontario the percentage of badly managed woodlots is not so much greater than the percentage of mismanaged farms.

CO-OPERATIVE PLANTING.

This last season has been especially severe on forest plantations. A late season with strong, cold winds followed by an extremely dry summer will probably result in some failures. On the poorer classes of soil the Scotch Pine and Black Locust have shown the best results. About two hundred thousand plants have been sent out this last spring, composed chiefly of White Pine, Scotch Pine, Jack Pine, Norway Spruce, and Black Locust. The department is prepared to make planting plans and furnish planting material free to parties having waste lands; the applicant paying cost of transportation of trees and doing the actual work of planting. For planting in spring of 1909, applications should be in before 15th of June, 1908. In this way officers of the department may be able to organize their trips into each district.

There has been in the last ten years a large decrease in the acreage of woodland in the old part of the Province. The following table has been compiled from the report of the Bureau of Industries, and does not include the newer districts opened for settlement in Algoma and Nipissing:

—	Sq. miles of land assessed.	Sq. miles of cleared land.	Sq. miles of woodland.	Sq. miles of slashland.	Sq. miles of swamp and waste.
1894	34,788	19,089	11,348	....	4,349
1905	36,288	21,620	7,634	2,779	4,257

The indications are that an increasing number of woodland owners are giving this question some consideration, but the proportion of woodland will likely decrease much further. Wood prices are such that there is a great inducement to overcut. Elm, Soft Maple, and other one-time inferior trees to-day bring a good price at the local mills, and this price is gradually increasing.

In order to keep up the proportion of woodland in Southern Ontario, we have the opportunity of re-planting waste lands. We have in old Ontario two forms of waste land. The small area on the individual farm which is untillable and may be in the form of steep hillsides, sandy or gravelly ridges, etc. We also have throughout older Ontario large areas of waste lands ranging from 1,000 acres to 60 square miles, which are not being farmed or improved in any way. In some cases this land has been cleared and cultivated, but abandoned. There is, in the southwestern peninsula of Ontario—that area lying west of a line from Toronto to Lake Simcoe—about two hundred square miles of this second class of waste land. The waste land in small parcels on the farms of the Province can only be improved by the individual owners, although the state can assist and co-operate, as is being done.

This other problem of re-foresting the large areas is confronting us. Why should we worry about it and what can we do? Re-foresting these lands would give protection to neighboring lands and to small streams having their source therein. It should also give a revenue to the local municipality where at present such lands are a burden in many ways.

Forestry management of these lands would supply work and raw material for local people and industries. Such management would also protect the ignorant settler from being persuaded into a farming experiment on such land. Lastly, it can be shown that forestry on such soils is a good investment, especially for the state.

To give some idea of forest planting as an investment, the following may be of interest:

One of the most promising trees for waste sand types of soil is the Black Locust. It seems to withstand adverse conditions and should be of special interest for waste land propositions. Very extensive work has been done in Hungary with this tree, where it is estimated that they have about 200,000 acres of pure Locust forest in the form of plantations. The Agricultural Department encourages tree planting, and sends out every year from five to six million Locust seedlings. This planting is done on soils which are absolutely worthless for agriculture, and the following table gives results from some of the earlier plantations:—

STAND OF LOCUST ON SAMPLE PLOTS OF ONE ACRE.

Plot.	Soil, quality.	Age, years.	Number of trees.	Average diameter, breast high.	Average height.
Seedlings.				inches.	feet.
a	Good.	30	558	5.3	63
b	Best.	31	512	7.5	60
c	Fair.	30	594	4.3	38
d	Poor.	30	288	3.0	20
Second-growth					
e	Fair.	8	452	3.3	30
f	Good.	15	643	4.3	47
g	Fair.	15	391	3.7	33
h	Poor.	15	324	2.3	20

These figures are for a district where the annual rainfall averages 21 inches, and the temperature ranges from zero in winter to 95 degrees Fahr. in summer. This district is very similar to Southern Ontario, and the figures are of more value to us than any results obtained in the middle western States where planting has been done on good soils.

The first table where plots are of seedling origin, are 30 years old and would average 488 trees 5 inches in diameter and 45 feet high, estimating two fence posts to the tree we would have 976 posts at 20c. a post, which would give an annual gross revenue of about $6.50, and this on non-agricultural soil.

The second table which represents second-growth of coppice, meaning the sprout growth coming up from the stump after cutting, shows better results than the seedling plots.

The fact that this growth can be had on poor soil in from 15 to 30 years, makes this tree of value to the farmer. Black Locust at this age is chiefly of use for posts, vine stakes, poles, fuel and general farm work.

The proper management of these waste land areas in the agricultural part of the Province is of direct interest to the farming community, and I feel that the solution is of vital interest to such an organization as the Experimental Union. What good has been accomplished in this Province along the lines of reforestation, is largely due to earlier efforts of this Union. The work has only had a beginning and this organization can do much to further the cause of reforestation.

MR. GROH: I have done a little work along this line. On the farm upon which I live I built a barn, and, some years later I learned that the trees with which I built the barn, had grown on that farm during the lifetime of the gentleman, who formerly lived on the farm. The old gentleman stood at the back of the barn, and told me how a fire had swept across the woods, and burnt up everything clean. I said to him, "You do not mean to say that these big pines on the hill have grown up since?" and he said: "Every one of them." I said: "Surely you do not mean these big pines?" and he said: "Every tree was burned away." I built that barn in 1887, and, the trees have grown since 1804. I can think of another point Mr. Zavitz made when he spoke of wood lands. On another farm I purchased recently I find that if we cut out such trees as we really despise in the bush, the beech and such like, there would be very little wood left. I turned the cattle out of the woods, and I planted trees, and we have trees now reaching from 18 inches to 4 and 5 feet, and I think it is now time to cut down the weeds and give the trees a chance. A great deal can be done to re-forest your wood lands. The young trees grow slower on the sod, than they do where they are protected.

Two years ago I started under the direction of Mr. Zavitz to plant trees on the hill-side, and last year we had very good success. This year the drought struck us and we were not quite so encouraged. Our successes have come from simply following instructions. Our failures often teach us much, and, I think that we learned more by the failures of this season than we learned by the comparative successes of a year ago. I think our future is more sure after a failure than it was before. Lands and hill-sides that are now eye-sores can be made beautiful and profitable by planting them to trees. I often wonder when I see the hill-sides all naked and bare why they were ever cut down; they are of no value for cultivation. We have these hills all about us, and we have started in the work or re-clothing them, and believe it is going to be successful. The little pines planted a year ago have made a growth of 8 inches. Some of these trees were planted in a lucerne field, and when we planted the little pines about the size of a strawberry, and expected them to grow through lucerne, we expected a lot, and, yet we find they are doing it. Last year we had an extremely dry season, and we feel that we must give them a better chance.

While I may not live to build another barn from trees of my own planting, my children may be able to do so, and, my boys may grow up to say, "Father planted these trees," and, may be the old man can go around on a crutch and say, "I planted these trees," and it will be something to say if we can see trees 40 and 50 feet high on hill-sides, that we planted with our own hands. I believe it is a thing to think about, that should not be lightly cast away. They say you will be an old man before you will get anything out of this; but I have always said, that as soon as I know they are established and growing, I will consider they are worth hundreds of dollars.

I am not going to wait, because I am not going to use all that is in this world, before I go. I am going to leave something behind, and I would just as soon leave some pine trees growing as a bank account. I do not know that I will be praised more by having a bank account to leave behind, than to have a large bank covered with pine trees. If you do not succeed the first time plant them again. Mr. Zavitz will help you along with the work, and, if you are quite green in the work, he is not afraid to take off his own coat and help you to do it. (Applause).

The Chairman: Mr. Groh's enthusiasm in this matter makes me think of the statement made by an old man to his son: "My son, when you have nothing else to do, plant a tree." That is good advice.

RESULTS OF CO-OPERATIVE EXPERIMENTS IN APICULTURE.

By R. F. Holtermann, Brantford.

At the last annual meeting of the Experimental Union a committee on apicultural experiments was appointed. It was decided by this committee to carry on some co-operative experiments, and one was in connection with the amount of formic acid in honey in various conditions;—for instance, to make a chemical analysis of the amount of formic acid in honey when it was first started in the honey comb. That has been only partially arrived at. That is what we call green honey; then to leave it in the hive to see if there was any variation in the amount of formic acid in the honey. Another line of experimental work was to test the difference in the honey made by the common black and the Italian bees.

I may say that an announcement was made through the members of the Association, and also at some Bee-keepers' Conventions in the United States, and the response and interest taken was very satisfactory. We have one experimenter as far away as California. I sent to Prof. Harcourt a sample of some peculiar honey, and asked him to test it as to the amount of formic acid in that honey, and in his reply he said if any fermentation had taken place in the sugar, that would have to be deducted for the amount of formic acid. You will see that this opened up a difficulty in determining the percentage of formic acid in the honey. If the honey is taken from the hive, and the weather is warm, it is likely to ferment at a very early stage, and I saw then that we were up against a difficulty, and that our work would be misleading and valueless unless we were very careful.

Work of this kind has to be done in the slack season. I am wintering 374 stocks of bees, and the system which I pursue of moving about from one post to another makes the season a very busy one for me, and it is utterly impossible for me to pay very much attention to that kind of work during the busy season. My plans have been laid to do the work before the busy season, so that if each member would simply carry out his instructions and send his samples to Prof. Harcourt, he would be able to go on with the experiment. The experimenters were willing to go on with the work, but I considered that it would be unwise to go on with the experiment until we could overcome the difficulty. Prof. Harcourt says that we can overcome the difficulty by putting into the nectar, which is really thin honey, something which will prevent fermentation.

We hope that if this work is continued, that in the coming years, we will be able to have something definite. The work has to be done carefully. The first co-operative work was done in 1898, to determine the specific gravity of honey. The object of that was to prevent any honey being put upon the market unless it had reached a certain stage of ripeness. In the United States, they have a law prohibiting the sale of unripe honey.

We had a little expense in postage in connection with this work, but it was not worth while sending it in. We hope we will be allowed to act again, and that next year we will have something definite to show as to the result of the work we have done.

LEGISLATIVE CONTROL OF FEEDING-STUFFS.

By W. P. Gamble, Agricultural College, Guelph.

The subject of "Legislative Control of Feeding-Stuffs" has received considerable attention from this Association in the years gone by. For the benefit of those who are not conversant with what has been done, I would like to state, first, the reasons why this Association thought some action should be taken in the matter; and, secondly, state in brief what steps have been taken by the Association.

Most farmers have not the time to carry on any extensive series of experiments, and even if they did so, might arrive at erroneous conclusions. It is well known that feeders of live stock are frequently persuaded by plausable salesmen to purchase worthless feeds, and, as a consequence, lose or waste their hard earned cash. The experiments which they carry on are usually isolated, and isolated feeding trials are often misleading. For example, a feeder purchases a low grade stuff which he feeds to a particularly thrifty bunch of steers. The hay, ensilage, roots, etc., which comprise the major portion of the ration, are of particularly good quality. What is the result? We are told that the splendid gains made by the animals are attributable to the purchased feed. Mr. A. says such and such a feed did so and so, and thus the material is advertised.

Again, it is a matter of common knowledge that commercial feeds have received extensive advertisement from the fact that the first lots put upon the market are really good, in some cases considerably above standard. When, however, a demand has been created, the quality drops off and the manufacturer makes his money on the lower grade material.

Besides the variation in composition in the feeds as sent out from the factory, there is also the danger of adulteration by the dealer. The Experimental Union, in 1903, feeling in a vague way that much injustice and imposition were being done the farmers of the province, through the sale of inferior and adulterated feeding stuffs, passed a resolution that a petition, signed by the members present, be sent to the Minister of Inland Revenue asking that limits of variation be fixed for the main constituents of commercial feed stuffs. The petition was forwarded in due course and acknowledged by the Department, but no further action resulted. During 1904, attention having been thus called to the subject, the members of the Union spent considerable thought and observation upon it and were so fully convinced that their previous stand was a correct one, that at the annual meeting the matter was again brought up and the same action taken as in 1903. As a result of this petition, the Minister of Inland Revenue called a meeting at Ottawa on June 6th, 1905, at which there were present the Deputy Minister of Inland Revenue, Mr. W. J. Gerald; Prof. Shutt, Chief Chemist, Dominion Experimental Farm, Ottawa; the late Thos. McFarlane, then Chief Chemist of the Department of Inland Revenue; and Mr. W. P. Gamble, Assistant Chemist, Ontario Agricultural College. This committee, after full consideration of the subject, came to the conclusion; (1) that it was impracticable to fix standards; (2) that extensive collections of these feeding stuffs should be made, the samples analysed, and the results published in bulletin form.

These conclusions, which eventually took the form of recommendations, were presented at the annual meeting of the Union in December of 1905, and adopted. The published analyses of the samples collected showed that the fears entertained by members of the Union were well grounded, that the feeding stuffs varied greatly in quality, and that many of the brans were largely adulterated, and that their feeding value bore no relation whatever, to their prices. At the annual meeting last year these analyses and conclusions were presented, and a resolution was passed which advised as follows:

(1) That each package of commercial feed stuff should be labelled with the percentage of protein and fat contained therein;

(2) That the term bran should be legally defined;

(3) That copies of the resolution should be sent to Farmers' Institute meetings to be signed by the members, and that, when signed, they be forwarded to the Minister of Inland Revenue and construed as a petition asking for the labelling of packages and the definition of the term bran.

These petitions which were largely signed were in due course transmitted to the Department of Inland Revenue. A short time ago I wrote Mr. Gerald, Deputy Minister of Inland Revenue, asking what action had been taken or was in contemplation. In his answer he states, that the matter is receiving the consideration of the Honorable the Ministers of Agriculture and of Inland Revenue, but just what action was in contemplation he was unable to say.

It seems to me that it would be well for us to again bring the matter to the attention of the Government. I would, therefore, move the following resolution:

"That this meeting approve of the action taken at last year's annual meeting, and that we again urge upon the Honorable the Minister of Inland Revenue the desirability of a law enacted on the lines of last year's resolution.

"2. That if necessary a delegation be sent to Ottawa to urge upon the Government the necessity of Legislative control.

THE PRESIDENT: This is a subject which we might discuss for some time with profit.

W. S. FRASER: I am very pleased to hear the report of Mr. Gamble. I think it touches a point that has not been fully enough dealt with in the past. The adulteration of food is illegal, with regard to what men are supplied with, but animals consume far more food and are not protected. In protecting animals, we are protecting ourselves. Adulteration has been carried on to such an extent that it is time that something was done to prevent it. I have found that bran was adulterated not only with oat hulls, but also noxious weed seeds. We found this in a sample that was taken from one of the Ontario mills. A miller, of good standing, stated that he was offered carloads of this weed seed material from the screenings of the elevators at Fort William and Port Arthur at a low rate, and he was told how to make money out of it by mixing it with corn or barley. Throughout the country, we have seen oat-hulls served up with corn and barley meal. There is certainly some corn and some barley, but there is also a large quantity of oat-hulls. The ordinary farmer sells all his good grain in the fall and in the spring pays a greater sum per ton for this stuff that is a very inferior kind of food, and feeds it to his stock, and is disappointed with the results.

Now, with regard to the adulteration, not only this stuff, which is useless, is put in, but weed seeds are put in also. I am very pleased to second Mr. Gamble's motion. I hope the matter will be discussed fully and that it will be pushed until there is something done to prevent the injury that is being done by selling feed that is of very inferior quality, and also to prevent the introduction of the vilest weed seeds in this country, under the name of food. A gentleman appeared before the Seed Commission, and took his oath that the Government were doing wrong in calling them noxious weeds. He said they possessed medicinal values, and that some of them were worth fifty cents for half an ounce. And he took credit to himself that he was the first to inaugurate the dealing in weed seeds from these elevators.

MR. MASON: This is certainly a matter of very grave importance to the farmers of the province of Ontario. Ontario is particularly a manufacturing province from an agricultural point of view. We can bring the products of our own farms into a higher and better quality of food, and we can also make use of a great deal of the bran, and shorts and imported grains from the West, and I think I am within the mark when I say that millions of dollars worth of these products are used annually in this province. It touches closely the pocket of every Ontario farmer and feeder. I think it is only by constant pounding away on this question that we are going to get anything done, and I am very much in favor of keeping up this until we do succeed in getting something done along these lines.

Mr. Freeland: In our section, we have had feed brought in and offered for sale cheaper than good sound grain of our own growing can be bought for, and many farmers bought this grain and were disappointed in the results. I believe it was filled up largely with weed seeds, ground finely and mixed in with it and the purchasers were the losers.

Mr. Hallman: I think it is very important that something should be done. In our own community, we feed largely home-grown feed from our own mills, and we are not bothered so much with noxious weeds. I think, however, it is very important that this resolution that has been presented, and seconded so ably by Mr. Fraser, should be put into action, and I heartily endorse everything that has been said this afternoon.

The Chairman: I believe one of my own college chums, who is now an extensive farmer near Beamsville, has purchased extensively of this kind of stuff.

Mr. Gunn: I have not considered the matter sufficiently to put it before you in proper and concise form. The first two years of my experience in farming I kept a large number of horses, and consequently purchased a large quantity of bran. For the first two years, I was able to purchase Ontario bran from our own millers, but of late yaers I have been forced to fall back upon Western bran. I purchased it in lots of five to ten tons, sometimes taking half a car load, and the last two years I have noticed the bran from the West to be inferior. The horses will eat their food and in the bottom of the manger you will be able to pick up about half a handful of noxious weed seeds, and in these mixed weed seeds there were some which I could recognize, but a great many which I could not. These weeds are a great detriment to our Ontario farms. If we Ontario farmers are to allow our millers to procure bran from the West and put into it screenings, that they cannot sell for more than six dollars a ton, and sell it to us for $24 a ton, I think it is too bad. One particular lot of bran from which I have been feeding recently has material in it which has the greatest resemblance to saw-dust of any substance it has ever been my displeasure to meet. I know that a number of my horses, when I have mixed up a mash of this bran and placed it before them, will not take it. If we have to pay the price we have had to lately, and then get rubbish like that, and can get no protection, I think the country has come to a pretty pass; and our men at Ottawa evidently must have other interests at heart than the interests of the agriculturists when they do not put their foot down upon the distribution of this rubbish, and especially the selling of it in this country as bran. (Applause).

Prof. Zavitz: This matter has come before the Experimental Union for three or four years, and there has been no uncertain sound at each one of these meetings. A committee was appointed sometime ago, and a chemical investigation was carried on here at the College and numerous chemical analyses showed that there was a great need for some method of regulating the food stuffs for Ontario. I believe before long there will be some regulations with regard to this matter. A large number of the Farmers' Institute officers and members took up the question last year, and I had hoped there would be some Dominion regulations before this time. There are none as yet, but I think if we stick to it, we will get the regulations before very long. I am glad there is no uncertain sound with regard to this question.

Mr. Putnam: As superintendent of the Farmers' Institutes, I was pleased to send out last winter, copies of the resolution which was passed here, together with some statements gotten up by your committee, and they were signed by a great many of those in attendance at the Farmers' Institute meetings. I am not certain how many of them we sent to Ottawa, I think it was about 2,500, and they were representatives of nearly every county in the province.

Mr. Fraser has referred to the meeting which we have had in Toronto. It was quite a revelation to me to find the great variation there was in the food stuffs which are offered at the same price. Some of these food stuffs which are offered by local millers are well worth the money you pay for them, and other stuffs which the millers are able to put up so they can have the same appearance are not worth one-third what you pay for them. Mr. W. J. Clark gave us some startling facts before the Commission, and it seems to me that if some action is not taken, the farmers of this country will suffer very materially.

Both motions were put to the meeting, and they were carried unanimously.

The Chairman: Would it be in order to appoint that delegation?

Prof. Zavitz: I should think that it would be quite in order, and that it would be a very wise move. For the last two or three years there has been a committee; the members of that committee would form a good delegation to go to Ottawa. The members of the committee are the Hon. Mr. Monteith, Mr. Gamble, and Mr. Mason.

Mr. Grasser: While dealing with this matter, I think it would be well to include other foods than bran. The discussion seems to have concentrated on bran. There are mixtures of screenings and other stuffs which contain a large amount of adulteration and many of these weeds are prominent.

Mr. Gamble: In last year's resolution the other products were included and enumerated, and the petition asked that the percentage of protein and fat should be given and that the manufacturers should give a guarantee of the same. Bran and shorts were not included. Whole grains and meals obtained from the grinding of any single grain were also exempt in these resolutions. All other material such as, oat-hulls, pea meal, and pea bran, and so on, were included.

Mr. Fraser: Do I understand you intend to include bran, shorts and such like at this time?

Mr. Gamble: These, we exempted, that is to say, we do not ask the manufacturers or dealers to give a guarantee of the percentage of protein and fat in them; they were only required to keep out of them all foreign substances. We obtained a sample of weed seed ground by a milling company of Port Arthur, and we made particular analysis of this. Mr. Graham obtained a large quantity and fed it to his chickens, and as a result of his feed trials, he found this meal was not suitable for poultry food.

Mr. Frazer: If he had continued it for another week his chickens would have been dead.

The Chairman: The members of this committee are the Hon. Mr. Monteith, Mr. T. H. Mason, and Mr. Gamble, and I will ask you if it is your wish that these men should form a delegation to represent the Union at Ottawa, to urge upon the Minister of Inland Revenue the great need of legislative control of feed stuffs, and to insist on protecting Ontario farmers along the line set forth in the resolutions.

Hon. Mr. Monteith: I would ask to have some one substituted for myself, as I think you could choose from the ex-student body some one to take my place to better advantage, as my many duties might not permit me to accompany the delegation to Ottawa.

It was moved by Mr. Kewley, seconded and carried, that in addition to the committee above mentioned, the name of Mr. N. F. Wilson, M.P., be added.

Moved by Mr. Gamble and seconded by Mr. McRea, that Mr. C. A. Zavitz be added to the committee. (Carried).

Mr. Fraser: I hope that Mr. Monteith will be there at the head of that committee as his presence will have greater effect than any of the others.

THE FUTURE DEVELOPMENT OF THE FIELD CROPS COMPETITION IN ONTARIO.

By T. G. Raynor, Seed Branch, Dept. of Agriculture, Ottawa.

It has been the part of wisdom to give a good deal of attention for a number of years to the improvement of our live stock interests. Another interest which goes hand in hand with our live stock is our field crop interests. Until recent years the general farming public have not been aroused very much on this important question. Perhaps no factor has played such an important part in this work as our own Experimental Union under the wise and efficient direction of our zealous Secretary, Prof. Zavitz, and his zealous corps of helpers. They have successfully carried out the College extension work in farm crops, about which there is a good deal being said and written these days. It was perhaps the burning question in one form or another up for discussion at the recent American Association of Farmers' Institute workers' convention held at Washington.

When we realize that about 10,000,000 acres of this fertile Province is under cultivation and that of this amount one-half is sown with cereals and the other half is into meadow and hoe crops, we can perhaps get a little idea of the importance of our crops. If the productive capacity of these 10,000,000 acres could be increased, even one bushel per acre, it would mean a much increased revenue to our country. I believe it can be increased much more than this.

Prof. Zavitz is authority for saying that our field crops have a value of $135,000,000 per annum. The Provincial Department devotes about $70,000 per year to aid agricultural societies. Of this amount, how much has been given to promote the production of seed grain, even in the way of prizes at the fall exhibitions? In looking over the various prize lists, we are free to confess it has been comparatively little. In fact, we have to look in vain for any great improvement in our farm crops through this source. Perhaps it has been partly due to too many irregularities having been countenanced in the exhibits themselves. If there is any space left at the exhibition, you will find the grain and vegetables crowded together there, often without very much arrangement, and certainly with very little information regarding them.

The small quantity of seed required to be shown has enabled the manipulator, if at all inclined to be dishonest, to make his conscience so elastic that by picking over his seed grain carefully he could make it serve not only for several shows the same year, but many of those shows for a series of years until it becomes a standing joke, too practical to be tolerated any longer. Anyone who has judged the seed grain for one society three or four years in succession will know the truth of what I am saying. We have given the fall exhibition a fair trial and it has in a measure failed in improving the crop of the country very much.

Some years ago Mr. Hutchison, of the Exhibition Branch, urged upon the Hon. Minister of Agriculture, Mr. Fisher, the advisability of securing lands in the west and equipping them with help enough to grow seed grain for distribution to the farmers. Dr. J. W. Robertson, while in the Department of Agriculture, talked of establishing illustrative stations, partly to promote this line of work. These ideas were objected to on the ground it might interfere with the individual enterprise. It was then that Mr. G. H. Clark, the Seed Commissioner, suggested to the Minister that the holding of competitions in fields of standing grain might help the farmers to help themselves. In 1906, through the co-operation of the Provincial Departments of Agriculture for Alberta and Saskatchewan, the competitions were tried and proved successful. This season, through the Seed Branch co-operating with the Superintendent of Agricultural Societies for Ontario, eleven such competitions were held in this Province. They proved in a measure to be successful, and I believe that there has been no forward movement in field agriculture of recent years which is calculated to encourage the production of high class seed more than this one. It is wide in its application; it may extend to all field crops, and there is no reason it should not be extended to the pasture crops as well. Its advantage over the fall exhibitions is that the judge may be sure the crops he is judging are this season's growth. These crops represent (for there were 5 acre plots) a considerable quantity of seed which may become available for seeding purposes, and this fits in with the seed fairs which are held during the winter and spring. It will encourage the use of a regular rotation of cropping, clean farming, selection of varieties, better use of fanning mill in selection, better cultural methods, the intelligent use of fertilizers, and will encourage improvement in field crops by the hand selection of individual plants. It should be one of the most convincing arguments that the plans adopted by the Canadian Growers' Association for the improvement of crops are along right lines and should engage the competitors serious attention. To me the plan has a great future before it. Not only will it improve all these crops which are growing in this province as cereals, but as Prof. Zavitz has remarked, why may it not be extended even to the encouragement of our pastures? If it will increase the average productiveness per acre in grain, why will it not stimulate more attention being paid to our pasture mixtures, both as temporary and permanent pastures? Not enough attention has been paid to our pastures, which are every year increasing in area and playing a more important part in our farming operations.

Other lines of useful work which the field competitions might stimulate are the local shows where the competitions are held. As each competitor is a member of his agricultural society, he could contribute greatly to his fall fair by bringing a sheaf of his best production and a sample of his grain. He could give such information perhaps as the variety and yield per acre, the amount he has for sale and his price.

At our provincial winter fairs, the best of all the Province, as decided upon by the judges might be brought together to compete for a sweepstake prize. Such a display would be an education in itself, and would give the successful competitor a very enviable reputation in which he might honestly trade. It will furnish our wholesale and retail men with the information they require as to where suitable stock may be found for their trade.

The CHAIRMAN: I am pleased to introduce Mr. Nicholson, who has put into practical use on his farm what he learned at the College, as I understand that he secured first prize in the field competition. He is also a successful experimenter in connection with the Experimental Union.

Mr. C. Nicholson: I was very much interested in Mr. Raynor's address, probably owing to the fact that I was one of the warriors who was in the competition last season. Our field crops are receiving more attention than they have in the past. Our live stock has had more encouragement than has our field crops. On looking over the census of the country a few days ago, I noticed that the value of the field crops was $18,000,000 more than the value of all the other farm products put together. There has been considerable encouragement given to the introduction of new varieties of grain, grasses and roots and to the testing of them. The Experimental Union has sent out the leading varieties to all parts of the Province. The Canadian Seed Growers' Association commenced the work of improving our best varieties and outside of these agencies, we have not had very much encouragement to improve our field crops. Of course in the improvement of our live stock, our field crops have been improved indirectly, because it is the increase in the fertility of the soil that also helps to produce good crops. We must not forget, however, that our field crops are of primary importance, and that we should aim to continue the growing of better crops. I believe, in the next twelve years, we will be able to increase the value of our farm products by a hundred per cent., as has been done in the past twelve years, by better methods of farming. There is scarcely a farm in the Province that does not need more tile-draining. I consider that tile draining is a basis of good farming. If we have a well-drained farm, we are in a position to adopt a good rotation of crops, in which we can introduce clover and hay crops—clover to enrich the soil and to smother the weeds, and the hay crop to clean the land.

Regarding my own experience with the crop with which I took the first prize in 1907, I can say that five years ago, the land on which the crop grew was the poorest land which we had on the farm, but by tile-draining and a short rotation of crops, we have put the field in such a shape that it will produce a crop that will compare favorably with any crop grown in that section last year. There is room for these field crop competitions in every part of the Province. (Applause.)

The Chairman: It is certainly pleasant to note that the ex-students of the College are capable of farming in such a way as to take the prizes for having the best field crops grown in the district.

A Member: Are these competitions in connection with the Agricultural College?

Mr. Raynor: Altogether through the Agricultural Societies of Ontario. Mr. Wilson, Superintendent of Agricultural Societies for Ontario and the Seed Branch at Ottawa, have been working together during the last year. The Provincial Department made all arrangements with the local Society for carrying on the competitions and for providing prize money, and we furnished the judges and paid all expenses of doing that work. Mr. Nicholson said it would encourage rotation of crops. We found in connection with our work that there was scarcely a man in the whole lot that did not have a different system of rotation of crops from all the others. Those who worked to the plan of a short rotation, had fewer weeds on their farms. We inquired where they got their seed, and in almost every case they obtained it from some enterprising farmer who had taken up the work through the Experimental Union. There were a good many different varieties, and I believe these field competitions will do away with that, and it will supply the market with a cleaner supply of seed. Our seed law is having some effect upon the country, and it is bound to widen its influence. I see a bright future for the farmers of this country, and I believe the wholesale seed houses and the local seed houses will be looking to our best farmers for their supply of seed.

COMPETITIONS WITH FIELD CROPS.

BY J. LOCKIE WILSON, SUPERINTENDENT OF AGRICULTURAL SOCIETIES, TORONTO.

I am very much pleased indeed to have the opportunity of meeting the members of the Experimental Union, and to listen for a short time this afternoon to the able addresses that have been delivered. This is the first time that I have had an opportunity of speaking to the large body of students of the Agricultural College of Ontario, and I can assure you that it is a very great pleasure indeed for me to be here and see you in this magnificent hall. I, with a number of perhaps the fathers of the sons who are here, had something to do with the building of this hall. A number of years ago, we put up a protest against so many of our wealthy men spending their money in the great cities, and I was on a delegation of farmers that waited on Mr. Massey, and invited him down to this place, and during the course of conversation in his office, I intimated to him that it would be a very fine thing for the farmer boys of this Province, whose fathers are doing so much for agriculture, if he would build a hall of some kind at the Ontario Agricultural College grounds, and Mr. Massey said he would consider the matter. And evidently it was considered by him, and the result of the work of that distant day may have had some effect in assisting you in having this magnificent hall erected here. I am glad to know of the great work that is being done. I am not a member of the Union. Living in the most easterly county of the Province, we largely engage in the production of cattle for dairy purposes; but we have watched your work, and many of us have taken a leaf out of your book, and have been able to increase the production of our farms. Science and farming must go hand in hand. A great work devolves upon the students of this College and the members of the Experimental Union. The work before you is one that can scarcely be grappled with. I do not know of any other work that is of more importance to the farmers of this country, and to the citizens of this country, than the work you are engaged in. A short time ago, the book-farmer and the College student were looked upon as being of very little account; but that day has passed, and we come to the stage where men in all departments of agriculture recognize that agriculture is a great profession after all, and that the agriculturist requires more brain power and a more active mind than any of the other so-called learned professions, and in the near future agriculture will stand at the head of the learned professions. The legal profession, the medical profession, and the theologian or scientist will not stand higher than the agriculturist. Men are beginning to know the great possibilities of it, and in the department of which I have charge, these field competitions are being taken up with energy. It was late in the season before we had our arrangements made. We were at a loss to know how we should deal with the four or five hundred societies of this Province, and we decided the better way would be to allow the first ten societies which applied to hold the competition. We sent our circulars to every society in the Province and stated that the first ten societies complying with the rules would be the ones that would be accepted. Almost before the ink was dry on our circulars, we had the number we required over-run many times. We took out the first ten and the work went on, and Mr. Raynor has told you of the results. They have had a great effect on the farmers of the Province. This coming year we propose going a little further. I have a scheme on foot, and I had communication with Mr. Clark. He is willing to co-operate with us heartily in the furthering of this great work, and his department is willing to supply the judges,—and I must bear testimony to the excellency of the men sent by the Seed department last year. No complaints have come to the department that there was the slightest unfairness. I have not yet brought the matter before Hon. Mr. Monteith, but last year he gave us a special grant of $1,000 for the field crop competition, and this year we are going to ask for more, although I cannot name the amount; but I am sure the amount I ask for will be given heartily by the Department. I propose that we divide the Province into two sections, the Eastern and the Western, and divide the amount we expect to get equally between these two sections. And we think a fair way would be to take ten societies east and ten west of Toronto which have given the most money for agricultural purposes, as laid down in the Agricultural Societies' Act. If any gentlemen have any suggestions to make along this line, or in connection with any part of the department over which I have charge, I would be glad at any time to receive advice, and to consult with you at all times. I would be glad to get in touch with the students of your Agricultural College, as I am with many of the professors of your College, and with the officers of the Horticultural Societies of the Province ,and the officers of the Fall and Spring Fairs, and our Seed Fairs. I think these are strengthening organizations that will produce, as the years go by, good results, and will prove of great benefit to this country of ours. (Applause.)

PROGRESS OF THE ONTARIO AGRICULTURAL COLLEGE.

By President G. C. Creelman, O.A.C., Guelph.

On this particular occasion it has been the custom for the President of the College to say, just at this time each year, some things in reference to the progress of the institution, and in order not to break that time-honored custom, and for that reason only, I accept the programme which has been put in my hands, and shall say some things which may be of interest, particularly to our ex-students and visiting friends.

A College is very much like an insurance business, for an insurance agent is expected not only to do as much business as he did the year before, but to show some growth as well. So a College, if it will keep up its good work from year to year, must show substantial growth all along the line. In many phases of our work this is hardly appreciable—hardly to be appreciated by the ordinary person, hardly to be appreciated always by students in the several classes. By that I mean, there is some work that does not show up as much in colleges as in other places. For instance, the President of an institution of this kind is brought very much farther forward in the public light than he oftentimes would care to be; he often finds his photograph coming out in the papers; he finds himself pushed forward not only at agricultural gatherings, but at other times when he would much prefer that someone else could take the part. They could in many instances do it much better, but many things are said about him that are meant to be said about the institution. If anything happens in connection with the institution upon which it is to be congratulated, the President of the institution gets the telegrams; whereas there are many people more obscure,—lecturers and demonstrators who scarcely come forward at all, and whose names are not known to many of you, except to those who actually come in contact with them—men who are doing the actual work referred to, who are making for the College students, and giving students an opportunity to make of themselves men who are going to be a credit to this institution—and yet their work is hardly noticed at all.

It is on behalf of those, from the lowest demonstrator to the most prominent of the professors, that I want to pay tribute to-night to a large extent for the success of the work during the past twelve months.

Without a student body, of course, we could not accomplish very much here. With reference to the boys, I have only to say to-night, they are here and will speak for themselves. They are here in increasingly large numbers. We have a total enrollment in all classes, short courses and others, of 1,077 different individual students during the past twelve months. That is a record, so far as attendance is concerned. This number is made up of students in our general course or long course in agriculture of 358; students taking irregular work in agriculture, 18; students specializing in manual training alone, 29; in the dairy courses, 63; in short courses, stock and seed judging, 302; in poultry, 24; in Domestic Science, 243; and Nature Study students, 40, making a total enrollment of 1,077 students since the first of January, 1907. These students come, as most of you know, from all over the world. This year our enrollment has not differed very materially from the enrollment of other years, but it may be interesting to some of you if I briefly state just where our students came from this year, the great majority, of course, coming from the Province of Ontario. Outside of that, Alberta, 5; British Columbia, 12; Manitoba, 3; New Brunswick, 4; Nova Scotia, 13; Prince Edward Island, 2; Quebec, 7; Saskatchewan, 3, every Province represented. Then in alphabetical order from other countries:

Argentine Rep.	8	Japan	3
Belgium	1	Jamaica	2
England	29	Mexico	1
Egypt	1	Scotland	8
France	1	S. Africa	1
Germany	1	Spain	2
Ireland	3	U. S. A.	23
India	2		

In regard to staff changes I would like to say just here, that as in former years we deplore the loss of members of our faculty from among the officers. It seems impossible, in a large Institution of this kind, to have a year go by without some changes having taken place. This year I may mention in particular that we lost Miss Rowsome, our teacher in French and German and Librarian, who has gone to Macdonald College, near Montreal. Her place has been taken by Miss Dwight, whom we have with us. Miss Bigelow left us to go to St. Anne's, and her place was filled by Miss Irene Allen. Mr. H. S. Peart was promoted to the new fruit farm which has come into possession of the Province of Ontario within the last year, and his work here is taken up by Mr. J. W. Crowe. Mr. H. S. Arkell, lecturer in Animal Husbandry, left us to go to Macdonald College, and we were fortunate in securing from Arkansas, one of our own graduates in the person of R. W. Wade. Mr. H. G. Bell, of the Experimental department, was called away to Iowa at a larger salary, and his place taken here by Mr. C. R. Klinck.

Then we have had some additions to the staff, because in these growing times every year chronicles the opening up of new departments of the work, and this year we notice in the Chemical department a very important addition, something probably with which you have not come in contact. I refer to the new Flour-testing or Bread-making Bureau of that department. For a long time our millers have been sending samples from our flour mills away to Chicago to find out whether our flour was good or not. You see, our house wives could have told us that—so they did, when they were consulted, but we have put in a department here, and now the millers are sending to us; and the Professor of Chemistry was telling me the other day that a miller at Galt has sent two samples and asked for analyses. One was No. 1 and the other No. 4. He was disappointed to find that the lower grade gave him a larger and stronger loaf than the wheat for which he was paying nearly twice as much, and he said, "They must have got things mixed at the College," but a good friend of ours down here in Guelph said, "They don't mix things there." The facts are that the millers of the Province of Ontario may have been selling flour of which they did not know the value, and that they have been charging for a particular kind of flour twice as much as it was worth, simply because they had been led off by color or something of that kind rather than by having accurate methods to go by. And so we are trying to help the food industry. So Miss McPhee, and afterwards Miss Purdy, was engaged and is doing a splendid work.

The work with our girls at Macdonald Institute has also grown. At first it was thought that short courses in Domestic Science proper were all that were necessary for the work. Girls came in large numbers to take the three months' course, but afterwards they found they could be spared longer from home and so we put on a three months' course in Domestic Art, and many of the girls are now taking six months instead of three. Miss Fonda came there to fill the position in September. Then we have created a Department of Economics with a lecturer, in the person of Mr. H. H. LeDrew.

This is not the time nor the place to speak in detail of the good work being done in the several departments, but I should like to call your attention to the fact that at last city people are beginning to take an interest in our work. For instance, we were asked this fall if we could spare our Lecturer in Forestry to lecture in the University of Toronto, and if next year we can spare our Lecturer in Physics to lecture to Forestry students in the University of Toronto, and within the last four or five weeks different organizations in the city of Toronto, namely, the University of Toronto, McMaster University, the Canadian Institute and the Canadian Club, have invited one or more members of the staff of this College to come into that great city of Toronto and tell them some of the things that are being done for agriculture in the Province of Ontario. We feel very much pleased that now, after all these years of slow growth, the institution as a whole is coming to be recognized as a factor in the upbuilding of the Province and of the Dominion.

In closing, I should just like to say, that we appreciate the return, in such large numbers, of our graduates and under-graduates of the years gone by. Professors and lecturers, demonstrators and students may all do their best, but there is over and above that the necessity always for a good tone in the country, if an institution is to do its best work. That tone must come from those who know us best, and so I thank the ex-students, one and all, for their quiet sympathy and support which is backing up the work that we are doing here to an extent which you may not realize and appreciate, but we do and we thank you for it.

ADDRESS.

By Hon. Nelson Monteith, Minister of Agriculture, Toronto.

I have always felt pleasure in coming back to the annual re-unions here, and mingling with those who have been classmates with myself. It is now twenty years since, as a freshman, I came to the College at Guelph. At that time the equipment of this College was very limited indeed as compared with the College we find to-day. We were glad indeed at that time to skate on the risky Speed, with the air-holes, and all the rest of the inconveniences. We little dreamed at that time that it would be popular at any time in the history of this College to agitate for a covered rink. However, things do move, and progress, all along the line, I think we may safely say, has been made. You have added to the equipment to-day many of the conveniences that at that time we scarcely thought of, although President Mills, who, I regret to say, has been unable to be with us to-night, in a prophetic way looked forward to much of what has been accomplished. He was persistent in his efforts to bring about what we find to-day. He was followed when he was taken—may I say to a higher sphere?—I will not say that, but to another sphere—he was followed by a man who, I believe, is going to make a worthy successor. One of the best signs I may mention regarding him is he is gathering around him a staff of competent men. I like a man whose judgment is fairly good, because it speaks a good deal for himself; and then, not only that, but he relieves me of a great many responsibilities. He goes to those public dinners, and says a great many nice things that please the people, and in that way possibly fits the situation better than I would. (Laughter).

However, I would like to make a few remarks to the young men, because I can now safely claim to be not as young as I used to be. You are now at that stage of manhood when almost "Every goose is a swan and every lass a queen." The world is to you bright, I trust, and you have in your make up that joyousness of life that does so much to tide us over the later and possibly more difficult passages in our life's history. Your cares are largely those of the class-room. These seem to you at the present time large indeed; the ever recurring examinations have to be passed, and they are in themselves a very large feature in your life's history at the present time. But remember that those are but the stepping stones to greater things. You have a great mission in this country, a country of vast resources; a country stretching from east to west for about four thousand miles, and from north to south from five hundred to seven hundred miles, a land that may be occupied in the days that are to come. You have a vast heritage in your keeping, and I trust as the years go on that our agriculture may become even more progressive. I may as well say it here, there has been a great rush from the farms of Ontario to the cities and to the Western Provinces. We are proud indeed that Ontario's sons have laid so well the foundations of things in our Western Provinces. We have given of our sons largely to the laying of the foundations of the West, and we are glad indeed to rejoice in their prosperity; but I would like to draw your attention to the fact that we are doing a little farming down in old Ontario yet; and while the West looms large not only in the eyes of our own people in Ontario, but in the eyes of the old land, do not forget the fact that we are doing some farming in Ontario. I notice by the last printed returns which we have to hand that we produce of cereals in Ontario 186,000,000 bushels. West of Lake Superior to the Rocky Mountains in that same period they produced 172,000,000 bushels; showing that after all, old Ontario, though we say little about it, is producing more cereals than all, we may say, west of Lake Superior. These are the things that begin to make us feel that we have a great mission in this old Province of Ontario, and when we begin to consider the products of our farms in other lines, the products of the West sink into comparative insignificance. Our dairy interests, our live stock interests, our poultry interests—which are to be displayed down at our Provincial Fair where they are so well exemplified—these represents in themselves vast wealth indeed. So much so, that I think I am safe in saying that the young men before me have a great mission in this grand old Province of Ontario. We have a great work yet to accomplish. We have a number of agencies at work; for, after all, the Agricultural Department of the Government is one of the great educational departments, and we have working in connection with that Department your Agricultural Societies, which begin their existence almost contemporary with the government of this fair Province, showing that the people even at that early stage acknowledged the value of science in agricultural pursuits. Then we have, passing along the line of influences at work, this great College at Guelph. It is one of the many trusts reposed in our charge, and we feel in connection with this institution almost a greater responsibility than all the rest combined, because it touches the very life work of our citizens at an earlier stage in their existence than almost any of the other lines of agricultural effort. But I shall go further to-night in making bold to say that we are not willing to stop at agricultural colleges and extension work. Through the country schools in this Province we are bound, in the near future, to touch still closer the great heart of progress, namely, the rural public schools (cheers); and I trust that we are not infringing upon what some may say is the rightful territory of the Educational Department because we claim, after all, as has been said by one of the speakers here to-night, to touch closely at that educational part of our system which has so much to do with manual labour. We want to elevate and dignify manual labour, and I believe I am safe in stating in the presence of the gentleman who has been called to the high position of the leader of the educational system of this Province in his position as President of our State University, feeling assured of his acknowledgement, that manual labour has a dignity that is too often unappreciated.

I shall not trespass any further, upon your time other than to say, and I can state with a certain amount of assurance that so long as your needs at the College can be shown to be in the best interests of the people of this Province, that you shall not go away empty when you seek. The resources of this Province belong to the people, and it is our duty so long as we occupy the treasury benches to safeguard those resources so that the greatest revenue can be produced from those resources for the furthering and betterment of the people of the Province of Ontario; and we believe that in no better avenue or line of work can money be expended than the training of the hands and of the minds of the people of this great Province of Ontario. Therefore, I say, that we are delighted to have the President of our Provincial University here with us to-night as our guest, not only on account of his known interest in educational effort, but, also because of the interest which he feels in the agricultural education in this Province. From the great agricultural constituency from which the University draws it will find many of its brightest students, and it is to be remembered that on the farms of Ontario about half of the population still lives. I trust that that proportion may not decrease as years go on, because in these stirring times, when so many schisms are abroad indicating the instability of things socially and otherwise, it is well that we have with us that steady influence which is given to society by a large agricultural population. Therefore, it is for the young men to elevate and dignify this great calling that the people may not be drawn away from it.

ADDRESS.

By R. A. Falconer, LL.D., President, University of Toronto.

I have to thank you very heartily for the kind reception that you have given me here this evening, and Mr. Monteith for the words with which he has introduced me to you. When about six weeks ago I received a letter from your President asking me to be present on this occasion, I responded at once in a hearty manner, because I felt that although probably it did mean a speech, and although I was likely to have no time to prepare one, which has also been justified by the event, nevertheless that it was too strong an attraction for me to resist. For many years I have heard of the Agricultural College at Guelph—its fame has gone far beyond Ontario—and everything that I had heard in the past had placed it on such a high level that I was anxious to see it for its own sake, and even, more especially because of the intimate relation in which it stands both to the life of Ontario and to the University of Toronto. Since coming this evening, although I have as yet seen only the beginning, I can recognize that one is in the midst of a very potent, influential, and beneficent institution. I have been very much struck by the tone that I have felt in this gathering. Not only is there a very high level, if we are to judge by what we have heard from those who have passed through the College, but there is a spirit animating the whole institution such as must in the long run benefit it and leave a fine impress upon those who pass through it. If Miss Doak, and Mr. Jones, and Mr. Rose are to be taken as fair examples of what those at present in the College can do, you are certainly to be congratulated upon the degree of their attainments and of what you have been able in addition to do for them. (Cheers). Not only are you to be congratulated because of this, but, further, because of the very apparent heartiness that enters into all your proceedings. One who is in the habit of visiting very frequently different gatherings can soon tell whether or not there is within those who are gathered in the audience a spirit of harmony and unity, and high, earnest endeavor. There is some impalpable method one has of judging, and I myself feel that what I have seen fully agrees with what I have heard so long. You also have the material for great things in the future. I do not mean particularly in your own profession, for I was delighted to discover in the remarks of those who spoke as representing this College that you have here a spirit of education, that you understand something of what education involves, and have recognized something of its privileges. You are evidently versed in the literature of the past, you have also shown your prowess in the present, and what astonishes me is that Prof. Day—who, I am sure, has been rewarded not at all to his merits but in a very happy way, nevertheless, by this recognition from the students to-night—that Prof. Day is a man who apparently has such scientific ability that he can drag a bull all the way three times from Chicago to Guelph. (Cheers). Now, those of you who know the classics remember that men who in the past carried bulls to such a distance were regarded as giants; they were sometimes, you may remember, expected to eat the bull afterwards, as Milo, for instance, who brought it on his shoulders. But such has been the change wrought through science, a science which, I am glad to say, you are learning at this institution, that you can accomplish great things simply by the exercise of scientific skill. Moreover, you have now a subject for the future Muse of this institution. I recognize that one of the speakers was quite a classic: he referred to the Georgics of Virgil. He may remember that in the Georgics of Virgil the most beautiful passage is written concerning the bees. Now, I think in modern days you can substitute another word for bees, another word beginning with the second letter of the alphabet; your Muse can now rise to the glories of the Chicago Bull. (Applause.) You recognize, as I have already said, what science does for you, and I am sure that in this College the meaning of science has been brought home to you, so that you are aware not only of its applications to the ordinary work that you will meet on the farm, but that you will also go to that work with an enlarged mind, and with a broader outlook; that when you walk across your farm and see in that the possibilities of future material development, you will also be able to understand something of the principles that underlie all the constituents of your farm products, of the soil; yes, and of the very universe of which this soil is a part. A man who knows the principles of science has his imagination awakened to the vastness of our environment. He knows, for instance on the one hand, through his study of bacteriology and physics, how minute are the constructions of the universe; and on the other hand when he turns his eyes to the heavens, he is aware how vast are the distances, how great is the sweep of the law, and that from these greatest things down to the least and invisible, there is the one underlying order, and that this order, I believe you all recognize, is a moral order. A man who goes with such a spirit as this out into his daily work is more than a drudge, and he finds in his work a means of education. His day's toil, as he goes to it in the morning and returns in the evening, becomes to him a means of elevating him; he is not merely lost in the routine of things, but he is stirred to nobler thoughts, and he discovers as the days pass that through the instrumentality of his daily toil he is developing within him those things that are permanent, those things that set him above the daily toil, and that make him the master of the situation where he is. I believe that one of the greatest accomplishments of civilization and of learning has been this, that men have come to recognize that man's life is noble, that the days of slavery have gone by, that manual toil can be elevated and dignified, and that in it, ennobled by the man who does it, he can find a scope for an education that is not confined always to books, but that discovers wherever there is an enlarged mind a means for still extending it further. And so such an institution as this should be sending out into our country men and women of power and insight and of breadth; and we may look to the future to have on our farms and from our farms even greater results than in the past. These results in the past have been great. Those of us who have anything to do with educational institutions are aware that there is no constituency anywhere that sends a finer class of student than the constituency of the farm, and that our country will remain intelligent, and that our universities will be well supplied, as long as we have a population devoted to agriculture and agricultural toils, that is ennobled to its true meaning by an education such as is given in an institution like this.

I hope also, as Mr. Monteith does, that the relative proportion between the farming population and the urban and village population may not be changed to the detriment of the farm. It will be a sad day for us should it ever come—I do not believe that in Canada it ever will—but it will be a sad day should the time ever come when people would rush from our lands into the cities, and crowd themselves into mean and narrow streets; lose their individualities, as is so often the case, in factories, and have their children brought up where they have no breadth and scope, and where they hardly know whether there are stars or not. It is a happy day for a land where the great majority of the people are still in the broad open space of God's world.

Then, it is a good thing to know that there are so many here. I was astonished to learn that there have been over a thousand registered in the past year, that you have over 300 regular men students taking the four years' course, and over 116 women students in residence. That is a very great showing, and I trust that as the years go on the number will increase, that the generous legislatures of the present and future will deal generously with this institution, and meet the needs, as I am sure they will, when they are set before them. But remember that as you go out from these halls, you thousand students, that you also have duties, and that you cannot escape the responsibility of bringing before the people the requirements of such an institution as this. One of the reasons that I rejoice in being present is because I believe that from this College there will go out men and women who, besides being educated and technically trained, will also have a sense of what they owe to the body politic. If the life of the people through the country is kept healthy and pure as it has been, and we come from good stock, if the duties of the citizen are wrought into the minds of those who are on the farm, then I believe there will be a strong, healthful, public interest abroad, and the life of the country as a whole will remain pure, or will be purified. And so I would urge you, when you go out, to carry your education with you, and not to think that you can live a life to yourselves. The man or woman who lives a life to himself or herself may become a wealthy farmer, or a wealthy farmer's wife, but that individual becomes a narrow person as well that is of very little value to any one, and probably of none to himself or herself even. If you go out with a fine sense of your duty, a fine sense of your responsibility to others, with an elevated moral ideal animating you, and resolve even if it be at some cost to yourselves, and with actual reluctance, nevertheless that you will take your place, in the rural parts, in the school sections, in the municipal councils, or wherever it may be, then you will be contributing of what you have received here, and enabling those who come after you to get some greater share of the privileges that you yourself owe to others who have preceded you. Remember this, that none of our best things come to us without effort on the part of some one. There is also an old Greek motto that said "The gods sell us all our blessings in return for toil." These blessings that you enjoy are the result of the toil of others, and remember that the coming generations will hold you responsible if, after entering into such a heritage you do not transmit it, and thus make the heritage of our public life better and purer for those who will succeed us.

I wish you every success, Mr. President, in the institution here. It will give me great pleasure to see students come up to the University from this College to receive their degrees from the Chancellor, and I hope that more of our students in the University, after they have received there what we can give them, will return to receive from you the training for efficient work, and that they will go out on to the farm, and that we shall have men and women consequently of higher and higher intelligence.

PRESENTATION TO PROF. G. E. DAY.

A pleasant incident in the proceedings here occurred, being the presentation of a gold watch to Prof. G. E. Day on the occasion of the Colege students finally winning the Chicago Union Stock Yards Trophy for the judging of cattle, sheep, and swine.

Mr. D. M. Rose was spokesman, and said: Some reference has been made this evening to the winning of the bronze bull, but I am sure that still further reference will not be out of order. The bull which we see adorning our platform is going to stay in Canada, and since he has come to stay in Canada it is fitting that he should receive a proper introduction to this Province and to this Dominion. Of course, the bull naturally wished to spend his declining years in Canada, but unfortunately for him our American cousins had somewhat of a claim upon him, a claim which he did not think he could break. Therefore, the O.A.C. sent a party of students to Chicago to see whether or not they could prevail upon him to come to Canada for a season. You know that two years ago the bronze bull came and spent the winter on College Heights. He enjoyed that winter so much that a second party of students last year had little difficulty in inducing him to stay another winter. Our climate was so genial, and agreed with his health so well, that this year we have been able to prevail upon him to take up permanent quarters at the O.A.C. (Applause). In the words of the song, "The bull has come home from Chicago, and he won't go back any more." He did not come of his own free will exactly. It was necessary for us to send students to bring him here. He is here, ladies and gentlemen, because of the calibre of the teams which have been sent from this institution to Chicago. Because of their clear-headedness, their clear thought, and their decision, they have been enabled to win out against all other competing colleges. But, although the calibre of the men actually composing those teams has been of the very finest, they were not born stock judges; the ability to weigh the merits of one animal against those of another, to give clear, logical reasoning why one animal should be placed above another, this ability was not inherent in these men. This ability has been trained into these men, and much as we desire to honor the three respective teams which have won this trophy for us, we desire still more strongly to honor those men who have trained into these teams the ability to bring the bull to Guelph (Cheers). And who are these men, may we ask? Mr. H. S. Arkell had a large share in the bringing of the bull on the first and second occasions (Cheers), Mr. R. W. Wade has had no small share in the final winning of this trophy (Cheers), Dr. Reed has trained every stock-judging team which we have sent to Chicago, in the judging of horses (Cheers). It has not been our good fortune, to bring to Guelph the horse trophy, but that is not Dr. Reed's fault. How could we learn to judge horses when we had no horses to judge? and, even having horses, how could we win the trophy when the horses we had to judge in competition were as different from those we have here as a Shorthorn cow is from a Jersey? How could we win the horse trophy? Dr. Reed has done his part, and the showing which we have made in horses is but a foreshadowing of the events which are to come (Hear, hear). There is one other man, though, who has had a very large share in the bringing of the bull to Canada; that man is Prof. Day. (Cheers). There have been sent from this College six or seven teams to Chicago. At first those teams were not successful, but Prof. Day has made those early teams stepping stones to ultimate success. He has imparted to each of those teams his own coolness, clear-headedness, and logic, and it is to Prof. Day that we owe the great victory which has recently been won. (Cheers). We look upon the bronze bull offered by the Union Stock Yards Co. now as a Day Trophy. Prof. Day is the man who has brought it here. The students of the College know, perhaps better than any one, just what Prof. Day has done, and we have thought we could not do less than in some small way show our appreciation of Prof. Day's great value to this College, of the great victory he has achieved, and if Prof. Day will kindly come to the front, we would like to show something of our appreciation for him.

Prof. Day, the students of the College feel that, as I have said, you have brought the bull here. We have all sat under you in various classes; we feel that we know you well, and we know that you know us. We appreciate your personal kindness to us, and for that reason, and for the great victory, we ask that you will accept from us this gold watch. It is but a small mark of our appreciation towards you. We trust that as the moments pass you may be reminded of this most auspicious occasion, and that your happiness and prosperity may gather such momentum as will carry you over all cares and troubles of this life. (Applause).

Prof. Day: A previous speaker said something about facing a crisis, but this event has completely taken the thoughts out of my mind which might have come there under ordinary circumstance. I would just like to say this, because I do not wish to occupy time, that nothing was further from my mind when I came to this meeting to-night, than what has occurred; that I appreciate more than the gift, beautiful and valuable though it is, the kindly sentiment which has accompanied it, and I shall value this gift as representing that sentiment. I thank you from the bottom of my heart for your kindness; I thank the students for the support they have always so loyally given me in my work, because no man can do good work unless he has the material to work upon. It is because we have had good material that we have been successful in the past, and I believe we have good material coming on, and while we may not win trophies, I feel sure that the students of this institution will always give a good account of themselves wherever they may be. I thank you again for this very generous expression of your goodwill.

THE TEACHING OF AGRICULTURE.

By C. C. James, Deputy Minister of Agriculture, Toronto.

For nearly fifty years the subject of agricultural instruction, in some form or other, has been before the people of this country. About the year 1860, when the education system of this Province was being elaborated, it was proposed by Egerton Ryerson, Superintendent of Education, that, in order to make instruction complete, agriculture should be taught, if not in all the schools, at least in some of them, and so he set to work to produce a text-book. Some of you may perhaps have seen that book. It is a book that is valuable even at the present time; in many respects it is still up to date. That came and went and nothing more was heard of agricultural instruction in our schools for many years. There were other things which were considered to be of more importance. The teachers of classics and mathematics and science in turn held the floor, and the attention of the education associations and the people of the Province was divided by the advocates of those branches of teaching. In 1890 a second text-book was issued. It was prepared at the request of the Department of Education by Principal Mills and Professor Shaw of the Agricultural College. Now we had a new text-book, and surely we were going to get the thing done well. I was on the staff of the Agricultural College at the time, and I know that these men labored early and late at the text-book, and we all felt we had some personal interest in the book, and when it was finished we thought that at last a new era had dawned. However, in time it went the way of its predecessor. Some eight or nine years later I was asked to prepare a text-book, and I thought my time had surely come. The book was prepared and was used in a few schools. It was authorized also in Nova Scotia. An edition adapted to Manitoba was used in that Province. Some of the States put it on their list of recommended books. Judging by the printed reports of the Minister of Education, the attempt was made to teach the subject in many schools, and the impression seemed to have gone abroad that at last Ontario was leading the way in agricultural teaching in the public schools, But, alas! the attendance fell off, the classes decreased, the enthusiasm of the teachers vanished, and the book appears to have now nearly disappeared from the public schools, its place being taken by text-books in nature study. The encouragement given to nature study appears to have driven agriculture as such out of the field.

See what has happened. We have had at least three text-books prepared for the educational system of this Province and placed in the hands of teachers; there have been spasmodic attempts to teach agriculture, and suddenly the whole thing has disappeared from our schools. Many people who are considered as authorities said the text-books were all right. What was the reason that they did not prove effective? The reason has been this, that the teachers of the rural schools, in particular, have never received the training that would make them competent to handle the subject, even when provided with text-books. None of you will say it cannot be taught. None of you will say it should not be taught. But you can see how everything in connection with it failed when the teachers were not qualified to teach the subject. I am sure you are all interested in this subject and you feel that if it can be taught it should be taught.

Having ascertained the one weak spot in the former attempts to teach agriculture in schools, the question arose, "What is the best way to make a more successful attempt?" A very favorable opportunity arose when we had a new Government, with new men coming into office who were willing to try new things, and I had placed in the hands of the Hon. Mr. Monteith, the Minister of Agriculture, a somewhat brief memorandum making a suggestion that perhaps we had begun in the wrong place, and with the wrong kind of teachers, and that we should make a new start with the right kind of teachers.* The suggestion was made that perhaps we could utilize the services of some of the graduates of the Agricultural College, men who should be well equipped to carry on that work. The next point was, where should that work be done, and the suggestion was made that perhaps it could be best tried in connection with our High Schools, because the High School is the only school that represents the whole county. It was then suggested that perhaps we might start on a small scale, with four to six High Schools in the Province. After that memorandum had been in the hands of the Government for some time, my attention was called by President Creelman to the fact that a somewhat similar memorandum had been placed in the hands of the Government by Dr. Seath, Superintendent of Education. When we compared these memorandums we were very much pleased to find that, although prepared entirely independent of each other, they were along similar lines. Now, then, we had for the first time the Agricultural Department and the Education Department co-operating along certain lines, and we felt that there was some hope of something being done. The matter was laid before the Government and we asked them to supply us with such funds as were necessary to make the experiment. The result was that six graduates of the Agricultural College were selected for the work by President

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* This Memorandum will be found printed on page 92.

Creelman, and these men are to tell you this afternoon what they have been doing. Six schools were selected by the Government, three in Eastern Ontario and three in Western. A very important point in connection with our recommendation was that there should be established in connection with each one of the schools, an office. You cannot teach agriculture unless you have a man competent to teach, and that man cannot teach unless he has pupils to be taught. Put a man into one of the High Schools and he will find fifty or perhaps three hundred students all aiming towards a profession; there are very few aiming towards farming or the Agricultural College, so that the teacher would at present find few, if any, pupils desirous of taking an Agricultural course. We felt that there must be a large amount of outside work done with the farming community; that the confidence of the farmers must first be gained. We did not expect very large classes during the first year, and thought the best way to start would be to establish in each of the six chosen districts a branch office of the Department of Agriculture, and to place in charge of it the man who was to teach. From that centre he could get a hold upon the farming community, attend the Farmers' Institutes, and meet in his office representatives of the farmers, carry on live stock classes, poultry institutes, and fruit institutes, and so gradually get his hand upon the farming community and prove to them that he had something that would be of benefit to them, and therefore attract to his class-room pupils who otherwise would not find their way in that direction.

Supposing we were to take the knowledge we have already gained in stock-breeding and seed-growing and horticulture and send it all over this country, and get the farmers and the farmers' sons to live up to that knowledge, what a wonderful revolution would take place? What we ask each of these men to do is to go to the different departments of this institution and gather together the knowledge that has already been offered here and go back to his own place and gradually spread that like a little leaven throughout the whole lump of the district; and if they do that there will gradually be inaugurated in this Province a movement which will uplift the whole farming community and will turn many of our High Schools from what they now are, training centres for business and professional life, into agricultural schools. I have come here with a great deal of interest, not so much to give you this talk, but mainly to introduce these teachers, and I shall listen with much interest to what they have to tell us, because what they are doing and what they have done will give you a far better idea of this work than any remarks that I may be able to make.

The six schools were selected by the Government and the men were allotted to these schools as follows:

County.	Town.	Teacher and Department Representative.
Lanark	Perth	R. S. Hamer, B.S.A.
Waterloo	Galt	F. C. Hart, B.S.A.
Essex	Essex	A. McKenney, B.S.A.
Simcoe	Colllingwood	R. E. Mortimer, B.S.A.
Dundas	Morrisburg	W. A. Munro, B.A., B.S.A.
Victoria	Lindsay	F. H. Reed, B.S.A.

The courses of work were drawn up by Prof. McCready in consultation with the staff of the Agricultural College. At the request of the Department of Education an annual inspection of the work is to be made by President Creelman.

Report for Lanark County: R. S. Hamer, Perth.

In coming before this meeting this afternoon, to follow Mr. James in the question of agricultural education, we have all of us been somewhat at a loss to know just what was expected of us. We are, I take it, desired to outline as briefly as possible what progress has been made in the inauguration of the new idea in our respective districts, to note factors and results which may be regarded as encouraging, and to forecast a little the possibilities of future development.

First, as to the work in the school. To a great extent the initial task in my section has been the clearing up of misconceptions. By degrees the townspeople and farmers are getting away from the idea that Perth contains an Agricultural College, and now it is only occasionally that I am referred to as the principal or the president of this college. The real nature of the course, as an option in the Collegiate, is beginning to be better understood, and by liberal use of newspaper space, information as to what the course comprises is being disseminated. As fast as possible, we are eradicating the idea that our course proposes to take any kind of a boy from town or country and teach him all the fundamentals of farming. The course is being laid before the farming public as an opportunity for their boys to receive secondary education, which will have a direct and practical bearing upon life on the farm, and which will tend to educate the boy back to the farm instead of away from it. Emphasis is placed upon the value of the course as a means of sharpening the boy's observation, of developing his judgment, of giving him new and up-to-date ideas, of saving him many hard lessons by experience, of giving him an insight into the "why" of many farm operations, and adding perhaps to his knowledge of the "how" and finally of increasing his general efficiency and making a better citizen of him. At Perth Collegiate, the agricultural branch of the curriculum, as at present outlined, occupies four mornings a week—the time which is occupied by the general students in taking up Latin, Moderns, Algebra, Euclid and Science. For the remainder of the general subjects, the boys of the agriculture option form a part of the regular class. In the agricultural work we are not endeavoring to take up the first year work of the O.A.C. in its entirety. As a matter of fact, some of the subjects are not being taken up at all, but on the other hand, some of the work in other subjects has already progressed beyond the limits of the first year work, and second year work is being taken up. While it is hoped that many of the boys will eventually go on to Guelph, it is quite possible that some of them will not do so, and it is the aim to give such pupils a course which will be complete in itself as far as possible. Supplemental examinations in one or two subjects will place the boys of our two years' course in a position to take up the second year work at Guelph, if they later decide to go on. In the matter of pupils, we were fortunate in forming the nucleus of a good class right at the start. The first morning we had ten pupils; two of these were not considered up to the standard in public school training, and were advised by the Principal to go back to the public school for a year to obtain their Entrance. They did so, and our number was reduced to eight. We have been unable to increase the number, owing to the fact that the large class of nearly sixty which entered the Collegiate this fall crowded the general class-room to its fullest capacity. Our class of eight, however, has been sufficiently large to make it possible to take up the work in an interesting manner, and we have been able to cover more work and to bring out more points than might have been possible with a smaller class. By reason of the scope of the subject and the many phases of agriculture which may be touched upon, it is not difficult to keep the class intelligently enthusiastic, and I have it from the parents in some instances that their boys would like to take agriculture all day, instead of during only part of it. That they take a real interest in the subject is illustrated by the fact that no invitations were required to bring them out to meetings, such as the Farmers' Institute and the Farmers' Club. In their class-room work they are continually propounding intelligent questions mostly on their own initiative, when bearing on the subject under discussion, but very frequently prompted from home or by their neighbors, on matters related to, or aside from the subjects they are studying. On the whole, the work in the school is encouraging. The chief difficulty lies perhaps in the lack of uniformity in standing of the pupils. Some of the boys have not passed the Entrance. Two of these are older boys and, as far as agriculture goes, are quite able to keep up with those who have their Entrance. We have one or two, however, who are perhaps not as well qualified as they should be, and are somewhat of a drag, especially in the general work, tending thereby to bring all of the class into disfavor with the other teachers. Under existing regulations, the attitude of the rest of the staff toward the agriculture option is best expressed by the word "toleration."

In addition to our two years' course, we are putting on after Christmas a three months' course in agriculture and business for older boys. Arrangements have been made with the Principal of the Business College to give a practical course in farm arithmetic, bookkeeping, correpondence, writing and commercial law, which will occupy the time of this class during the afternoons when I am not at the Collegiate. In agriculture, we purpose putting on a course almost entirely apart from the work of the smaller boys, taking up topics, rather than subjects, giving everything as definite and practical an application as we can. This course promises to be very popular, and already we have several applications for admission to it.

Turning to the other phase of my work as a representative of the Department of Agriculture, I can at present see greater opportunities for usefulness and greater possibilities for development even than in the work in the school. This part of the work takes up much more time than does the school work, and I believe that it is mainly through our work in this capacity that the school work can be popularized and developed. As in the school, so in my office work, there has seemed a persistent disposition on the part of some farmers to get an entirely wrong idea of the object in establishing the office and in placing a young man like myself in charge. I did not have to be told directly that some people were having a merry time at the expense of the young fellow sent down from Guelph to show Lanark County farmers how to farm, and I have no doubt that there are some who still enjoy telling one another how many things they could tell me if they wanted to. Through the medium of public meetings, private conversations, and the press, I have been endeavoring to offset this idea, and to point out the true function of the office and myself in connection with it was merely a channel through which a man may place himself in touch with any source of information he desires. I do not wish to convey the idea that public opinion has been generally antagonistic from the start. In fact, it has been a matter of surprise to me to find so many farmers in active sympathy with the idea, and I have no doubt that the cordial support of some of these has been the chief factor in increasing the popularity of the office, and in prompting men to come in and get acquainted, and usually to ask questions on almost every conceivable subject. There are enough people now making use of the office to more than justify the expense of its maintenance. In connection with my office work, I have endeavored to reach every accessible part of the country, getting acquainted first with the men whom it is important to know, meeting as many more incidentally, as possible, asking questions and gaining information on local matters and conditions wherever possible, either from farmers, cheese factories or from public meetings. Information thus gained I have found very valuable when talking with individual farmers in the office or in addressing public meetings from a local standpoint. As a means of getting in touch with people in large numbers, and of advertising the new work, I found fall fair exhibits supplied by the College of very material assistance. This proved a very popular attraction, and the directorates of all outside fairs, which it was possible to take in, were quite willing to bear all expenses connected with it.

One of the questions in my district which affords room for investigation is the improvement of the immense swamp areas, and rendering productive of the muck lands which have ceased to produce. One enterprising farmer near the town is co-operating in the investigation of this question and has turned over and fenced off sufficient land to give ample opportunity for experimentation with commercial fertilizers. If it is found possible to effect material improvement in these soils at a small cost, it will undoubtedly mean much to the owners of hundreds of acres of muck lands, which occur in every part of the county, especially in sections when award drains and municipal drains are arousing the owners to seek a means of rendering soil productive which it is now costing more than taxes to retain, and in which the first step towards improvement—drainage—has been accomplished or rendered easy of accomplishment.

In addition to the role which the office is gradually assuming, as agricultural headquarters for the surrounding district, the large outer room has become the rendezvous of the Farmers' Club, organized this fall at the time of the Farmers' Institute meeting. This club promises to be a very live institution, as the attendance of 47 at the first meeting indicates. We have many men in our section who are well qualified to introduce subjects and those who have already handled subjects for us were, in fact, well up to the standard of the regular Institute speakers. Evidently the discussion will be the most valuable feature of the club meetings, and contrary to the frequent experience in Farmers' Institute work, we have no trouble whatever in getting practically everyone present to take part in the matter of bringing up associated points, of contributing additional information, of corroborating statements by practical experience, or of asking questions. The interest taken by the young men is especially encouraging, and if meetings up to the present are to be taken as a basis of assumption, we can certainly look forward to a very interesting and educative series during the winter.

Time does not permit of more than brief mention of some of the more outstanding features which have already been accomplished in the matter of organization, nor does it admit of much enlargement on the future possibilities of the work, both in the Collegiate and in the office. Suffice it to say, that at the present time the latter is growing much more rapidly in popular favor, and as an outpost of the Department of Agriculture is already making its influence felt in the dissemination of information, and will eventually be able to do very important service in the investigating of local questions and in the collection and summarizing of facts, figures and other information of agricultural importance in the county and surrounding districts.

Before giving place to the next speaker, I should like to make brief mention of the co-operation we are receiving. I have already mentioned the assistance rendered locally by progressive farmers, and by the officers and members of the various farmers' organizations. In addition: I have to thank the Public School Inspector for material assistance in getting together a class in the Collegiate; our local member, Col. Matheson, for many references on the public platform in his visits to various parts of the riding, and the local press both in Perth and adjacent towns for generous devotion of space to editorial comments, and to articles I have submitted from time to time since June. I have also had much official assistance from the different branches of the Department at Ottawa, from the Central Experimental Farm, from our own Department in Toronto, and last, but by no means least in importance, from Guelph. I think there is scarcely a man on the College staff from whom I have not had to request favors of various kinds during the last four months, and while I have the opportunity I should like to express my appreciation of the cheerful manner in which they have rendered assistance whenever it was possible.

REPORT FOR WATERLOO COUNTY: F. C. HART, GALT.

The report of the class at the Galt Collegiate agrees in a measure with those already mentioned. At present there are eight students in this department, only some of these, however, taking the full course, the others coming in for special subjects, such as poultry, entomology, etc. These latter students are from the town; the others in the class are farmers' sons who are taking the full course at the Collegiate leading to matriculation, and we have arranged the programme so that they can take agricultural subjects in lieu of some of the non-obligatory subjects in that course. As might be expected, it is the farmers' sons who are taking the most interest. We are fortunate in Galt in having on the staff an enthusiastic science master, who, in his teaching in the regular classes, gives an agricultural trend to his instruction. The manual training teacher also is co-operating, and the agricultural students are given models and work in that department that apply to our work.

These three departments in the school, together with the domestic science, are planning to institute a fall fair or exhibit on a large scale, this exhibition to be conducted and the exhibits prepared wholly by the students.

In the class room we have not taken up our studies exactly as outlined in the circulars, but have endeavored to suit these studies to the pupils in the class. As was anticipated, this part of the work is of slow growth, but prospects point to increased interest and usefulness.

But, I realize that for this year, at least, the bulk of the work is outside the school—getting acquainted with the farming community, visiting the farmers in the field, talking and answering questions, and helping in any way we can, and in many of these little ways in which it is hard to report upon. For instance, driving up to a place and finding the proprietor in the orchard, opens up an opportunity for a talk right on the ground on, perhaps, some insect or disease that is troubling him and gives an opportunity for pointing out the value of spraying. In many little ways of this kind in going around this fall I think that good has been done, and though it does not appear much in itself, is spreading the gospel of preventing waste and the value of study as applied to the farming business.

The other methods I have used in getting acquainted, etc., are visiting the fall fairs, having an educational exhibit at some of these fairs, speaking at the fall institute meetings, getting acquainted at the Saturday markets. The local grocers in town who have a large trade with the farmers, have been used also, especially in the distribution of bulletins and information. In this way I have placed literature just where it will do the most good.

So far we have held in our district but one meeting, at Ayr. Professor Gamble came down to this meeting and after his address we had an interesting discussion on the feed question. The interest awakened in little meetings of this kind was shown here in the desire of those present to have a regular series of such meetings during the winter.

In such special meetings and farmers' clubs of this kind all over the country, we hope, in a quiet way, much good will be done.

We have also been awakening an interest in cow-testing. So far I have been doing quite a little of this myself for individual farmers, and, in this way, spreading the knowledge of the value of it. We hope to have a strong association of this kind in the district.

Of course we have the office and reading room comfortably fitted up on Main Street in the town, and it is being used to a considerable extent by the farming community. Not only all the leading agricultural papers are here, but opportunities are presented of distributing bulletins and literature where they will do the most good. In talking with farmers and others who come in we are able to place in their hands bulletins on the special subjects in which they are interested. One peculiarity I have noticed with regard to the reading room is that it is used by the town folks about as much as by the farmers. In fact many about town who own gardens come in to ask questions about insects, etc. The poultrymen also use it during the evenings. These rooms have also been placed at the disposal of the various agricultural societies, and these have been holding their regular meetings here instead of at the various hotels.

I wish to express appreciation of the help afforded, not only by the College but by the various branches in the Department of Agriculture at Ottawa, to the local press for advertising, and the officers of the agricultural societies in the district, all of whom have responded most readily for any help or information asked for. And though nothing sensational has as yet been accomplished, I believe that in a quiet way the work so far has shewn the fact that there is a big field of work here not only in the school, in the giving the pupils there, so many of whom come from our farms, a chance to get an education for their home work and leading toward the farm rather than away from it, but in these short courses and extension work outside, in awakening among the farmers themselves a deeper interest in the value of education and study of the principles underlying their business, and the necessity of the intelligent application of these principles.

Report for Essex County: A. McKenney, Essex.

The department of Agriculture was established in the Essex High School under very favorable conditions. From the first, the outlook for the eventual success of the movement was good.

In Essex are to be found the prime requisites for the success of a departure in this direction. In the first place there is at the head of the school, a progressive, broad minded, and sympathetic principal, who has given his enthusiastic support in every possible way. Then, also, the Board of the Essex High School is composed of men who fully recognize the value of education to the farmer, and they have done much by their personal help and generous financial assistance to give the new department a proper start. The Essex County Council also supported the work with a very liberal grant, and there is no necessity of the work being handicapped for lack of finances.

The support of such men as I have mentioned has been encouraging, but it must be remembered that the farmers of the county had not asked that a department of Agriculture be established in connection with the Essex High School, and, though we met with no active opposition, in the greater number of cases, we had to contend with indifference. This was, however, chiefly due to the fact that the work was not thoroughly understood.

As it was necessary to open the school in September, there was scarcely sufficient time to clearly demonstrate to the farmers exactly what we intended taking up in the school. The course in Agriculture was, however, explained as fully as possible through the medium of the local press, and by means of printed advertising matter, which was thoroughly circulated throughout the county. This, supplemented with a great deal of personal work, was the plan of our campaign conducted before the school opening.

When the term opened we had as a result of our efforts two students, who registered for the work in agriculture. These boys spend four half days a week of their time upon agricultural subjects, the remainder being taken up with the regular obligatory subjects of the high school.

The course so far has been very popular with these boys, who have signified their intention of remaining for the two years course, and at the end of that time, entering upon a more extended course at the O. A. C.

I have already mentioned the fact that we met with a great deal of indifference among the farmers when we first began to introduce the work in agriculture. In order to overcome this it was decided to use the fall fairs as a medium through which to show them the practical nature of the course which we intended to give. At the county fair, a judging competition for young men was instituted, suitable prizes were offered to induce them to enter into the different classes. Eighteen young men entered, and the competition was in every way successful, and did a very great deal towards popularizing the work taken in the high school. As a supplement to this work we made at every fair in the county, except one, an attractive exhibit, each feature of the exhibit being such as to impress thoroughly some practical feature of the work taken up by us in the school.

For instance, to illustrate the value of the experimental plot in connection with the school, we had a germination experiment upon exhibit, showing plainly the difference between sowing large plump, small plump, broken, and shrunken seed. Specimens of the San José Scale were shown upon the twigs and upon the fruit, and hundreds of farmers who had not been able to recognize it before became acquainted with it and the best remedies used to keep it in check. This work at the fall fairs was a very great assistance to us in many ways. The work in agriculture was more thoroughly understood, and we were able to get acquainted with farmers and conditions in this way better than would have been possible otherwise. And it was not without practical results, for at a short course of one week in stock and grain judging lasting from Dec. 1st to Dec. 6th, we had an attendance of 60 farmers' sons, who expressed themselves as thoroughly satisfied with the course. Several requests have been received since, asking us to conduct similar classes at different centres throughout the county.

The prospect for a good attendance of farmers' sons during the winter months is bright, and in every way the outlook for the future is encouraging.

There is another side to the work which we have been doing in the county and that is in connection with the local office of the Department of Agriculture, and it is through the work done in this office that the Agricultural department in the high school will eventually be made a success. Through this office we are enabled to bring the farmers into more direct touch with the Department of Agriculture and with the O. A. C.

Owing to the nature of the crops grown in Essex, it has been more difficult for the Department of Agriculture and the College at Guelph to keep in touch with the farmers than perhaps any other part of the Province, and for this reason it is important, and necessary, for the Department of Agriculture to have a man upon the spot to get acquainted with the conditions as they exist and knowing the conditions to work out and put the farmer in touch with the solutions of the problems they are up against.

As an instance of what the department can do for the farmers of Essex county, I shall outline one or two things which we hope to do during the year.

The San José Scale is an insect pest which has gained a very considerable footing in the fruit-growing districts of the county. In one township a by-law has been passed for the enforcement of the Act. During the past year an attempt was made to enforce this Act, but the attempt was not very successful, and the chief reason for this lack of success was due to the fact that many of the growers were not able to recognize the scale, and did not understand the mixture and application of the lime and sulphur wash, which was the remedy prescribed. In order to overcome this difficulty, to a certain extent, we intend holding demonstrations throughout the township. These will be held in badly infested orchards, in localities where spraying has not been practised. Here a practical demonstration will be given of how to mix the lime and sulphur, the proper manner and length of time to cook, and also the proper manner in which to apply it. These demonstrations, with a system of careful and thorough inspection will, we hope, help to stamp out the scale in these parts to a great extent.

Another important field in which there is room for investigation is in connection with the tobacco crop. There are many different lines which suggest themselves in connection with this very important crop. But there is one line of work in which something can be done for the grower to advantage by the Department of Agriculture. Although the farmers have been growing tobacco extensively for some years, every year in the history of tobacco growing in this county there has been some difficulty in obtaining strong, healthy, young plants. Many farmers, rather than run the risk of growing their own seedlings, depend upon neighbors and others for their supply, and as a result, strong young tobacco plants are often scarce and high priced. Upon the plot of ground acquired by the High School Board it is proposed to carry on investigation work with the different methods of germinating and growing young plants, with the hope of finding out some uniform method which may be adopted by the growers of the county to advantage.

There is other work upon which we are at present engaged, such as Institute work, etc., but the two instances which I have outlined will serve to show the nature and value of the work in which we are engaged and through which we hope to make the work in Agriculture in Essex a success.

Report for Simcoe County: R. E. Mortimer, Collingwood.

As is intimated in the programme, I am stationed at Collingwood, in Simcoe County, and those of you who may have travelled in that locality will know that at the foot of the Blue Mountains, along the shores of the Georgian Bay, there is one of the best fruit districts in Ontario. As well as the climate being very suitable, the soil is well adapted to fruit-growing, and every farmer is to a greater or less extent interested in that line of work. In this fruit district, as it can be properly called, we would naturally think grain-growing and stock-raising would scarcely receive such attention as is given them in other localities, and rightly so; though, I do not wish to convey the idea that we have no live stock and do not produce grain there.' Those of you who best know the district, will understand me when I say that farmers there are really a combination of fruit-grower, stock-raiser and grain-producer; can you realize the pleasure there is in working among such an intelligent class of yeomanry?

To speak of my work in direct connection with the Collegiate Institute, I may say that from the beginning of the term in September, I have had a class in Agriculture, there being at first two pupils, though only one of these continued the whole term. The attendance at the Collegiate this year, I believe, is much greater than has been for some time, consequently all the classes are large and each instructor finds his time fully occupied, so that I was asked to take Biology with the lower form, which I did until that subject was replaced by Physical Science early in November.

In Collingwood we claim to have a Board of Education, composed of conservative men. We can leave aside the political aspect, and still use this qualifying adjective, for it has been proved that they are particularly conservative in the matter of expending such sums of money as would be required to make alterations in or build an addition to the school, so that better accommodations for all the classes would be given. Their reasons for being particularly conservative, at this time, are perhaps two; and are as given,—First, our school has been built since 1879, and has not the modern equipment of schools built recently, besides it does not command the most suitable location; secondly, they feel that they would scarcely be warranted in spending any considerable sum of money for our department until it is shown that the farmers are going to make it a school where their sons are to get such instruction as will enable them to become very successful men in their life-work. These, then, are the reasons that I have had no special room for my work, but have had to do my teaching sometimes in the Science Laboratory and sometimes in one or another of the rooms that happened to be unoccupied at that particular time.

We have been fortunate enough to procure a splendid little plot of ground, to be used for experimental purposes and school garden work in general; though not close to the school, it is quite accessible, being at the corner of Tenth and Maple Streets, and lying with its broadside to the latter, which is one of the chiefly travelled thoroughfares of the town.

To get rooms for the local office of the Department of Agriculture was a problem that required considerable close attention; we might have had a much larger place than we have, but it would have been at one end of the main street, not at all where farmers usually congregate, and the rental would have been much higher than where we have located. Our present office is very central, and quite comfortable, being in a new block that was only completed when we obtained it. That office is now equipped according to instructions given from the Department at Toronto, with desk, chairs, tables, book-cases, filing cabinets and shelves bearing volumes of bulletins and reports that have been issued by the department during the past several years. An outer room of the office is supplied with a table upon which are kept the latest agricultural newspapers and journals, and around which are half a dozen very comfortable arm-chairs.

As yet, we have done nothing in arranging for short courses in seed and stock judging, thinking it better to leave that for consideration when the farmers grow more or less enthusiastic in the project; but, when we do inaugurate such courses, I believe, instead of holding them in town where the cost of keeping stock would amount to so much, as well as the rental for a place of meeting, we shall hold them at, say two places, farmers' homes near by villages, to which it will be possible to get a fairly good attendance, for there is scarcely any village so small, now-a-days, but that it has a congregation of young men several evenings in the week; we could then have the use of the farmers' horses or cattle or sheep or swine for judging purposes, and the only expense to be met would be that of advertising, which would have to be paid no matter where the meetings were held.

I have had the pleasure of attending the South Simcoe Teachers' Institute at Stayner, and the East Grey Teachers' Convention at Thornbury, at which places I addressed the meeting, outlining the work under way at the Collegiate at Collingwood. I find the farmers are quite anxious that I should go among them, and the directors of the Farmers' Institute are instituting a series of special meetings which I shall address, discussing the work, as we hope to have it done in the school, or speak on some other subject in which they are directly interested.

Just a word regarding the advertising we have given the department at Collingwood. We have not confined it to columns in the local press, but we have prepared circulars that outline the course very fully and these have been well distributed throughout the district. Later we got out a number (2,000), of cards of this style (exhibiting one about the size of an ordinary postal card), bearing an inscription which runs as follows:

IF YOU HAVE A BOY

Who will stay on the Farm, while his brothers may enter into various Professions,

WHY NOT EDUCATE HIM

for his life work, brighten his prospects, increase his income, and make his life the happier by giving him a course in Agriculture at the Collingwood Collegiate Institute?

For particulars apply to

P. W. BROWN, B.A.,
Principal.

R. E. MORTIMER, B.S.A.,
Agriculturist.

REPORT FOR DUNDAS COUNTY: W. A. MUNRO, MORRISBURG.

Judging from the remarks of the previous speakers it is quite evident that we six teachers are working along slightly different lines, with one object in view; and that the differences in the modes of operation are due not so much to the individual characteristics of the several teachers as to the peculiar conditions of the different localities in which the schools are placed. While one is in a corn and fat hog county, another in a beef county, and others subject to other peculiarities, Dundas is all given over to dairying; and all efforts, therefore, point to the improvement of the dairy industry.

When I returned to my work in August after having spent the month of July in conference at Guelph, I bent my efforts towards the establishment of a class in Agriculture in the Collegiate Institute, and with that end in view visited every quarter of the county, meeting and talking with farmers, and visiting picnics, socials, and teachers' conventions. With the assistance of an entomologist from Guelph, and a member of the Seed Branch from Ottawa, I conducted weed and insect exhibits at three fairs with good results. The exhibits were visited by hundreds, and favorably commented upon by farmers, teachers, and newspaper men.

But when the Collegiate opened there were no students in Agriculture, and day after day passed and still no students, and it was quite evident that I must set my sails to another tack. It was a debatable question for a time as to what course I should follow. The Principal desired that I teach part of the Science work in the Collegiate and so attempt to draw to myself a class in Agriculture from the students in Science. To this I objected for three reasons:

First, I would be working with a class who had already made up their minds to not follow Agriculture.

Second, I had given up the teaching of Science in a High School five years previously for the study of Agriculture and did not care to turn back.

Third, I was being paid by the Department of Agriculture, and if I were to teach Science to the neglect of Agriculture, the Department would soon find another man to take up the work to which I had been appointed.

My plan was now to visit each locality in the county, and by some means make myself acquainted with one man there and thoroughly propound to him the scheme. I talked of having a short course of two weeks in stock and grain judging in January or February. Every man to whom I presented the scheme thought it a good thing and that it would be a success. But every man to whom I put the question, "Will you be able to attend?" invariably answered, "No! I cannot leave my work. There is no one but myself to do the chores." Then I asked the question, "If I have a day on one subject, say Dairy Cattle or Horses, or Seeds or Grain, at your centre of business in a barn or blacksmith shop, and the evening lecture in your school house or town hall, will you be able to attend?" and the answer was invariably, "Yes!" My attention, therefore, has been directed for the past two months and a half, towards arranging for a circuit of these Day Schools, getting suitable animals, making the acquaintance of and obtaining the moral support of the leading men of the different communities, and in every possible way, bringing the farmers to understand that there is something pretty good being newly offered by the Ontario Department of Agriculture.

It is worthy of remark to see the difference in the way I am received by the farmers every succeeding time I visit a locality. The first time I visit a place I am looked upon as a new type of book agent or apple tree agent, and every succeeding visit I am received more openly until now, there is scarcely a home in the county but would make me welcome if I were to make a call.

A series of four Day Schools was arranged for the last week in November, and I look upon them as the most prominent corner stone in my experience thus far. My plan was to score a dairy cow in the forenoon and conduct practice work in judging dairy cattle in the afternoon. A lecture on some phase of the breeding, feeding and management of dairy cattle in the evening was followed by a detail of the new work of the Department of Agriculture. The place of holding the day lectures was a large well-ventilated, well-lighted stable or preferably a blacksmith shop.

The first day I was on the ground before 7 o'clock, sixteen miles from home, and spent from 10 o'clock in smock and overalls, cleaning and combing some good, but dirty cows, and cleaning a stable. Over twenty farmers turned out for the day demonstration, and in the evening thirty-four came with lanterns and lamps to the school house.

Each day was in a measure a repetition of the previous, except that after the second day the cleaning operations were performed previously, and the day meetings held in blacksmith shops.

But I had a different reception in different places. In one locality two representative citizens told me that their farms were paid for, that they did not want to bother with agricultural information, and that they would rather go to a dog fight than to my lectures. The sentiment expressed by these two men seemed to permeate the whole community, for it was difficult to find either good cattle or good buildings, very few farmers turned out to my meetings, and I was charged exorbitant prices for hotel and hall rent. At all other three places nearly every farmer for five miles around turned out, over one hundred in one case and one hundred and fifty in another, votes of thanks were passed, requests put in for a return on other subjects, and when I went to pay my bills, found most of them settled for. In one place I had the use of two large herds of Holsteins, from one of which President Cumming saw fit to choose a cow for the Truro Experiment Station.

I expect that the most of my time will be taken up with Day Schools until the end of March, for I am encouraged to believe that in progressive communities the farmers are going to take hold of them and come to see that the Agricultural department in the High Schools has something good to offer.

In this connection I should like to mention a difficulty I have in travelling. I have to use livery horses almost entirely and they are not good. The liveryman has no opposition and some of his animals seem to be a combination of all the blemishes that ever overtake a horse. If I were allowed expenses for a horse of my own it would be less expensive for the Department and more satisfactory to myself.

Concerning the office I have little to say, for the reason that it is not in operation yet. It is a former laundry stand. Some of the other teachers have been dubbed professor, and other dignified terms, but for six weeks I could not persuade the Chinaman to do any laundry because he thought I was prepared to run opposition. It is a well located place on the ground floor with a large plate front. But the former occupant could not be persuaded to move till the middle of October, and what with outside work it has taken me until the present to get it in shape. I am laboring under the disadvantage of being in a border town, which gives me but half the surrounding country of an inland town; but nevertheless I anticipate much from the office.

For experimental purposes I am given fourteen acres. This is to be laid out in lawns, campus, courts, and experimental plots, proper. As yet very little has been done, but next summer is full of hopes for me.

After my plans for the autumn were laid a student came upon the scene. He is not a farmer's son, and had no agricultural experience. I am privileged to teach him after school hours, and he is progressing as well as can be expected under the circumstances, for he is a bright youth; but having to start so low I cannot hope to make of him what I might of a farmer's son, other things being equal. If the teacher of Agriculture as well as the principal and the School Inspector had a say on the question as to who should enter for the Agriculture option it might save some future complications.

This is a most important work, and gives a man scope for his entire capacity. There are great difficulties to be overcome, and I wish to acknowledge here that but for a sensibility of the fact that the best minds in the country, and more especially those of the Agricultural Department, are supporting it, I should at times have almost despaired. I desire here to publicly thank the Deputy Minister for his timely advice and support. He has stood behind me more than once.

The farmers of this country are awakening to a desire for a more scientific investigation of the principles under which they are working, and if we as teachers now meet this demand in an able manner, these schools will stand as a mark of great moment in the history of agriculture.

Report for Victoria County: F. H. Reed, Lindsay.

Mr. James has just given to you the general outline of this latest step in agricultural education. We, the teachers and pioneers in the six counties selected, will attempt to tell you briefly how the plan is being worked out in our respective districts.

The work may be divided into two divisions, the teaching of agriculture in the High Schools and Collegiate Institutes, and the work done through the town office. With many, and particularly those engaged in educational work, there is a tendency to judge the success of our work by the number of students in the agricultural class in the Collegiate. At the outset I wish to state that I have one student in my class, and that for this first term I consider that just one too many. That seems a strong statement, but let me explain. This scheme of agricultural classes was not definitely formulated until June, and was not placed before the people until July, a very busy time for farmers. It is from the farm that the great majority of our students must come, for the course is planned specially for farmers' sons, as a preparation for life and work on the farm. The reason we have not this year more boys in our class is not because the farmers do not appreciate the advantages of agricultural education in the Collegiate, but because they are not yet familiar with what is offered. It is for this reason that I say I have one student too many; because I could do more important work elsewhere. For this first year our time would be well employed outside of the Collegiates. This is a movement in education intended specially for the farmers, and to make it successful we young men must get in close touch with the farmers of our districts. We must meet the farmers on the farm and there learn what are the problems before the men and boys on the farm—learn how we can be of use to the farmers. No one in this age disputes the advantages of agricultural education, but because of the great scarcity of farm labor, and the great need for the boys at home, we must bring home to both the boys and their fathers the advantages of an agricultural education before we can induce the boys to come to the Collegiate.

Right here is one place where we can be very useful: in bringing farmers into closer touch with agricultural education, and into closer touch with the Ontario Agricultural College. To-day less than one per cent. of the farm boys of the Province of Ontario between the ages of 16 and 21 are taking a course at this College. One great reason for this is a lack of knowledge concerning the advantages afforded by a course at the College. As we young men go among the farmers we can fully explain the broad course of education and training given by the College; we can arouse much greater interest in the O.A.C. and can send many students to its class-rooms. There are many young men who, after spending three or four years on the farm, realize their lack of knowledge of farm methods, and of the underlying principles of crop growing and stock raising. These young men consider themselves too old to go back among the boys at the Collegiate, but if we can come in close contact with them at this time we can send many of them to the College.

Another way of reaching these young men is by special winter courses in the Collegiate. In Lindsay we are offering a special short course in bookkeeping and agriculture. The course will take up the most practical subjects of agriculture, and bookkeeping as it should be applied to farm operations. Students will be given a good working knowledge of all common business forms, and a training in keeping farm accounts. Special effort will be made to induce more business like methods on the farm, and the keeping of an account with each field and each animal, or "bunch" of animals on the farm. The course in agriculture will take up animal husbandry, the breeding, feeding, and management of horses, cattle, sheep, and swine; dairying, the formation and care of a dairy herd, and methods of testing and caring for milk; field husbandry, a study of the soils and crops of the farm, surveying for tile drains, and measuring land; horticulture, growing of fruits and vegetables; veterinary science, a study of the blemishes and common diseases of farm animals; agricultural botany, a study of the grains, grasses and weeds of the farm; poultry, rearing of farm poultry for egg and meat production. This is a special course arranged for young men who can spend only a few of the winter months in school.

Next year it is my belief that we shall have large numbers in our agricultural classes. These students will be secured from the farmers' sons who will in July next pass the Entrance. Before the schools close we shall visit the country schools, and explain to the boys what is meant by the agricultural course in the Collegiate. By learning the names of those who are interested, and by talking the matter over with their parents, I feel confident we shall secure large classes.

The other branch of the work, and this year the most popular branch, is done through the town office. This is intended to be an information bureau, and a popular resort for farmers when they have a spare half hour in town. The Lindsay office is furnished as a reading-room, with chairs and a large table on which are always copies of several of our farm papers and magazines. This office is also used as a board-room, and in it the Horticultural Association, the Farmers' Institute, the Poultry Association, the Agricultural Society, and the School Teachers' Association all hold their executive meetings. At every possible opportunity I have been getting acquainted with the farmers of my district, and inviting them to make use of me, and to call on me at the office. I visited all the fall fairs, taking with me an exhibit of weeds and weed seeds, insects and insect remedies. I have spoken at all the Farmers' Institute meetings of the county, some twenty-four in number. I have attended meetings of several of the executives of the fall fair associations, and have addressed many of the annual meetings of cheese and butter factories. These meetings have brought my work before the farmers, but where I find my best work done, and where I really meet the farmers and their difficulties, is when I visit their farms, or when I meet them two or three at a time at sales or on the street. Every farmer daily meets many problems. On many of these problems he could find help in the many excellent bulletins issued by the College, and by the Provincial and Dominion Departments of Agriculture—if only he had time to look them up. The farmer is now, however, a very busy man, and we no longer hear of the long winter evenings in the farm home. Now that so much stock is stabled, the winter evenings are largely spent doing chores by lantern light. Our duty is to have this information readily accessible, and to be prepared to either answer or secure answers to all questions concerning agriculture. Already many of the farmers of Victoria County are coming to my office, and asking all manner of questions. As many as twenty-two farmers have called in a day, and the average on market days for the last month has been seventeen men. Mixed farming is the rule in Victoria County, and the questions include orchard pruning, vegetable and fruit growing, the raising of stock and diseases of stock, and many questions concerning tile drainage. The most frequent inquiries, however, are regarding identification of weeds and methods for destroying weeds, particularly the perennial sow thistle. Also I have frequently been asked questions concerning the improvement f farm crops by seed selection, and have placed several farmers in communication with the Canadian Seed Growers' Association. In our county the field crop competition has proved a great incentive to improvement, and from men who took part in this many inquiries have come concerning good seed.

I do not wish to trespass further on your time, but I should like to mention one more feature of my work. Although many farmers are coming to my office for information, and though our farm papers have a wide circulation, and though a number of very valuable bulletins are annually issued by the Departments of Agriculture, and though our Farmers' Institutes meetings are well attended, though all this be true, yet we are not reaching the boys and young men on the farm. The men who are attending Institute meetings, who are studying farm bulletins, who are reading farm papers, are the older farmers, men who have learned by experience much concerning farming, men who have also learned the value of agricultural education. But where are the boys, and the young men? We must reach them, and to reach them we must have something special. It is for these boys and young men that the Government has established agricultural courses in the Collegiate Institutes. It is also for these boys and young men, as well as for the older men in Victoria County, that we have prepared at Lindsay, to give in January, a five-day Short Course in Stock and Seed Judging. The farmers, young and old, are going to come to this course in large numbers, and this course alone, in improved crops and better stock, will give ample returns for all the money which will this year be expended in agricultural education in Victoria County.

THE DEPARTMENT OF AGRICULTURE AND AGRICULTURAL COURSES IN HIGH SCHOOLS.

(*This Memorandum was presented to the Minister of Agriculture in 1906.*)

The undersigned begs to submit for consideration a plan that proposes to assist in the introduction of the teaching of Agriculture in the High Schools of Ontario, and, at the same time, greatly extend and materially improve the work of the Department of Agriculture.

The ideal organization of the Department will be to have a specialist, an agent, a trained agriculturist, located in every County or District of the Province, paid by the Department and whose entire services will be at the disposal of the Department for the benefit of that County or District.

This local representative would be the moving or directing spirit of every agricultural organization, assisting the famers, directing special movements for improvement, inspecting, instructing, advising, reporting the appearance of any new pest or disease, procuring information in regard to all questions that farmers would ask, keeping the Department informed as to all agricultural conditions, and be the direct link between the farmers, the Agricultural College and the Department. In a dairy section this man should be a specialist in dairying, in a fruit growing district he should be a specialist in horticulture, and so on for all sections.

He should have an office where he could be found for consultation at stated times, and at other times he should be out among the farmers. He would be the directing man in the Agricultural Society, the Farmers' Institute, the Horticultural Society, the Farmers' Club. While he could not be expected to know all things, yet he would be able to procure information for them as might be desired. He would be the man "on the spot" to report new diseases, new pests as soon as they arrive and to report to headquarters with a view to procuring help. Through him the special needs of the district could be investigated and all Departmental movements could be directed. He would be able to systematize a great deal of work that is now done spasmodically. He should be expected to go to the Agricultural College for, say ten days or two weeks every year, to inform himself as to the new work there being done with the object of taking the results back to those farmers who are unable to visit the College. The result of personal contact would be found much more effective than through the sending of printed reports and bulletins. To put it in another form, he would increase many fold the value of printed publications. Set down in a county a live, energetic, enthusiastic young man trained in the best practice of farming and having an Agricultural College education, and tell him to study the farmers' conditions, assist them in their work, to find out their needs and direct them along the best lines, and in a few years the effect should be most satisfactory.

At present the Department is working very satisfactorily, in many ways and in many places, but with a corps of workers of the class I have referred to the benefits would be more equally and widely distributed, and the work so systematized that the agriculture of this Province would be extended and intensified throughout every County and District. The future of Ontario agriculture lies largely in specializing the production of high class articles suited to each section,—it would be the duty of these men to assist in this specializing.

The work to be done by these men would, of course, largely depend upon themselves, though the Department could direct them more or less. As it is, requests for help come in continually from all parts of the Province. Help is asked in a great variety of ways; this work could be directed and assistance given through these men. There is plenty of work to be done if only we had the men located ready and able to do the work.

Where would we get these men? Naturally among the graduates of the Agricultural College. The demand for such men would stimulate young men to train themselves for this work. Beginning with four or five men whom we could pick out and train specially for this work, we could gradually incease the number until the whole Province was covered.

What would it cost? We should be able to secure these men at, say $1,000 a year. If we located four the first year, the entire cost at first should not exceed six thousand dollars. Part of this would be saved along other lines: where now we are compelled to engage special men and send them out to do special work.

What has the first question as to teaching Agriculture to do with this? My answer is as follows:

Select now say four young men and also four points at which they would be stationed. Make this proposition to the school boards of these four towns: the Department will provide your High School with a teacher of Agriculture for the next three years if you will permit him to organize a class in Agriculture in your High School, and also if you will provide him with a small plot of ground for experimental purposes. This young man would conduct the classes and with his class take charge of the experimental plots, the material for which would be supplied by the Experimental Department of the College. This would take up a portion of his time. The rest of his time he could devote to the other work of the Department referred to above. At the end of the three years' work the Board of Trustees would be expected to continue the work of instruction, themselves paying for the services of the teacher of Agriculture just as they provide the other teachers or masters of the school, and the Government representative would be free to give his whole time to the general work of the agriculture of the County. This agricultural teacher would be able to give the teachers in the model school some instruction in Nature Study, attend teachers' conventions, and also from time to time advise with rural school teachers who were really trying to teach their pupils the simple principles underlying agriculture.

This plan or scheme is perhaps very crudely outlined, but it must be remembered that no scheme can be definitely planned from the first. The main thing is to have some plan to start on, something for a beginning, and then wisely direct it along lines of development as experience dictates to be the best. The great thing is to make a start and then let it work out naturally. There are two things very evident: the first is that we should do something at once to assist in the work of teaching agriculture, and the second is that there is an overwhelming amount of work that can be done in the way of assisting the farmers of this country. One serious defect in our system so far has been that we have not begun at the right end of the work; we have not been working with the young classes of the community and have not been able to follow up our work. We have been doing a little here and a little there, and the results prove that if only we could settle down and continue working incessantly in one place, we would see results that would astonish the people. We need more concentration of effort, more working year in and year out along definite lines. We need a man continually on the spot.

Let us take the case of the Napanee section. The Trustees and Board of Trade have asked for help, and as a native of that section I know the conditions and am particularly interested. Twenty years ago it was one of the greatest barley growing sections of Ontario. The loss of that industry wrought untold hardship. Recently dairying has revived the agriculture and put new life into the farmers. Now fruit and vegetables are becoming a specialty and one of the largest canning factories of the Province has been erected. That district needs directing along new lines. The High School is open to an instructor. Everything is favorable. There is plenty of land adjacent to the school for experimental grounds. The canning factory is within walking distance. It would pay the people of the town and county ten times over to have an expert there continually and for them to pay for such an expert, but it would seem as though it would be necessary for the Government to prove this by putting the man there. If he does his work well, at the end of three years' work he would have so proven the value of the instruction that there would be no hesitation as to the Board of Trustees assuming the expense of continuing such instruction. The great thing is to get this work started and to get it started right. Further, men cannot be picked up at a moment's notice; they must be selected and directed so as to prepare themselves for it.

Another effect of having these men engaged in this work would be that many students would be directed to the Agriculture College, farmers' sons attending the High School, who would otherwise go into professional or business life, simply because there was some one at hand to give them the bent in the right direction.

Enough has been said, I think, to indicate what might be attempted by thus having located at various points agricultural specialists, who could give agricultural instruction to classes in the High Schools and also carry on special work for the Department of Agriculture.

The question now may be asked as to whether there is anywhere anything to guide us, any example of such work.

In France there are what are known as Departmental Professors of Agriculture. In 1879, a law was passed that within six years a chair of agriculture should be founded in every Department of France. The men are chosen on examination. The salaries and expenses of these Departmental Professors are paid one-half by the Minister of Agriculture, and one-half by the Minister of Public Instruction.

The duties are as follows:

(1) To give agricultural instruction in the Normal Colleges, and, if so required, in other institutions of public instruction.

(2) To hold agricultural conferences in the country districts of the Department.

(3) To undertake special works or missions entrusted to them by the Prefect or the Minister of Agriculture.

There are eighty-seven Departments in France.

The plan I have outlined was suggested to me by a study of this system of France and an acquaintance with the increasing demand of this Province for help along so many lines of agricultural work.

C. C. JAMES.

COURSE IN AGRICULTURE.

By Prof. S. B. McCready, O.A.C., Guelph.

During the year the Provincial Government appropriated $6,000 in order to establish agricultural departments in six of our High Schools. The schools at Essex, Galt, Collingwood, Lindsay, Morrisburg, and Perth were selected as representative centres and six College graduates put in charge.

At the request of President Creelman I prepared a tentative course of study for the Department of Education. In this work I consulted with the College staff at large, and had the help of Professors Zavitz and Hutt in the final revision. The outline was drawn to cover a two years' course, corresponding to the present two years' course in commercial work given in many of our High Schools. It was an adaptation of the course outlined in the Education Department's Regulations of 1904, prepared, I believe, by Messrs. Lochhead, Muldrew, and Mills. The work was, however, stated more specifically and framed in accordance with the experience and work of recently established American Agricultural High Schools. In general content it includes such of the instruction and practice of the first two years of our College as could be taken by one special teacher in an Ontario High School when assisted by the teacher of Science.

The two-year outline was afterwards changed so as to permit of greater freedom in the treatment of the subjects by the teacher. The Education Department's regulations regarding their Agricultural departments are included here with the course of study.

I also prepared at your request for the use of the Department of Education, and as a suggestion teachers and school boards, a list of such equipment as might be ultimately required, with approximate cost of the same. It follows the regulations and course of study.

AGRICULTURAL DEPARTMENTS IN HIGH SCHOOLS AND COLLEGIATE INSTITUTES.

The following courses in Agriculture and the list of apparatus are being considered by the Education Department. In addition to such courses, pupils in the special Agricultural departments will take the subjects that are obligatory on all pupils, with such modifications as may be deemed expedient by the Principal and approved by the Education Department.

Part of the proposed scheme also is that the teacher of Agriculture would take classes in his department in the school, of pupils from the surrounding country, the members of which might not be in regular attendance in the other High School classes; and that, if practicable, he would hold special classes at suitable times in other parts of the county. In addition this teacher would act in the neighborhood as a special agent of the Agricultural College.

I. ACCOMMODATIONS REQUIRED.

A laboratory, school gardens, arboretum, experimental plots.

II. COURSES OF STUDY.

First Year.

Agricultural Physics: To keep records of the weather in standard book supplied by O.A.C. Physics Department, of accidents from lightning; of average temperatures, rainfall, etc., and to report monthly on same to the O.A.C.

Examination and classification of soils; laboratory exercises on elementary physical analyses of school garden or home garden soils; local excursions for the collecting and studying of soils. Pupils should be able to recognize, name and describe the different kinds of soils of the neighborhood.

Laboratory exercises to estimate the water capacity of different soils; to demonstrate capillary force; to show how soil water is conserved and the necessity for conservation; drainage.

Chemistry: Oxygen, hydrogen, nitrogen, carbon; air, water, ammonia, carbon dioxide—a practical course.

Agricultural Botany: Weeds and weed seeds: seed testing for purity according to the rules of the Seed Control Act of 1905. Experiments to show the relations of the plant to the soil, light, air, temperature and moisture.

Study of tree growth.

Plant families of chief economic importance.

Horticulture: Selecting and storing flower and vegetable seeds for next year, Methods of gathering, grading, packing, storing, shipping of fruits; visits to orchards, cold storage plants, canning factories, markets, fruit shows. Treatment of fruit plantations, pruning, spraying, cover-crops.

Propagation by seeds, budding, grafting, layering, cuttings. In the spring, making and keeping of a garden with plots for carrying on some of the experiments of the Experimental Union—such as testing varieties of fruits and vegetables.

Constructing and caring for a hotbed.

Field Husbandry: Experimental plots in the school farm in accordance with 'Experimental Union; one on cereals, one on fodders, one on root crops.

Germination tests of the selected seeds of common farm plants.

Seed judging; changing seed, quantity of seed per acre.

Animal Husbandry: Visits to local stock farm, to learn best methods of housing, feeding and handling farm animals.

Visits to fairs or stock-sales to become acquainted with different breeds.

Judging of types of farm animals; beef and dairy cattle, light and draft horses, bacon hogs, short and long wool sheep.

Dairy Husbandry: Visits to local cheese factories and creameries to learn, in general, the factory methods of caring for milk, utensils and finished products.

Dairy stables: lighting, cleaning, ventilating.

Individual cow testing: this to be carried on by some of the students at home.

Poultry: Visits to poultry plants, shows, markets. Planning and building poultry houses.

Leading breeds; care and feeding of fowl.

Farm Carpentry: A modification of the ordinary Manual Training course to suit farm boys.

How to use, sharpen, care for such tools as a farmer's kit should contain.

Models of joints, splices necessary in making farm buildings or appliances.

Farm Arithmetic and Beekkeeping, etc.: Practical measurements of land surfaces, wood, stone, walls, tanks, bins, mows, lumber.

Cost of fencing, buildings, silos, feeds.

Study of market reporting in daily papers, local and foreign.

Assessment rolls and methods of fixing tax rate.

Keeping farm accounts of each field.

SECOND YEAR.

Agricultural Physics: Soils: Work of first year continued.

Methods of tillage; underdrainage and taking of levels.

Mechanics: Principles of farm machinery; pumps, levers, pulleys, engines.

Principles of ventilation, lighting, draining.

Chemistry: Soils, fertilizers, foods.

Agricultural Botany: Work of first year continued.

Farm Crops: Study and classification of leading cereals, grasses, legumes; diseases and how to recognize and combat.

Forestry: Study of the common trees of the neighborhood; care of a small forest nursery in connection with the school farm; transplanting; reforestation of waste land.

Visits to local saw and planing mills; grades of lumber and prices.

Horticulture: Work of first year continued.

Plant Diseases: Common vegetable and fruit diseases; spraying and fungicides; practice in orchards of neighborhood.

Economic Insects: Study of injurious and beneficial species; insecticides and their application.

Garden Work: Experiments in conjunction with the Experimental Union.
Plant breeding and selection.

Field Husbandry and Farm Management: Systems of rotation; laying out of a farm; mixed farming; special farming; intensive farming; cost of farming operations.
Improvements of soils by fertilizers, manures and clovers demonstrated in experimental plots on the school farm.
Seed selection: Experiments on school plots to show its value.
Plant breeding: Experiments on hybridization on school plots or at home.

Animal Husbandry: Work of first year continued.
Feeds and feeding; rations.
Care of animals in sickness.
Animal physiology.

Dairy Husbandry: Care and feeding of cows; rearing calves.
Chemistry of milk; elementary bacteriological studies of milk.
Milk testing; Babcock testers.
Management of hand separators, barrel churns, butter worker, butter printer.

Poultry: Care and feeding; treatment of common diseases; elementary laboratory study of the embryology of a chick; incubation.
Individual hen records by means of trap nests.

Manual Training: Farm blacksmithing; use and care of iron-working tools; exercises in repairing farm machinery; exercises in making such articles as rings, chain links, harrow teeth, cold chisels; welding and tempering.

Farm Economics: The Agriculture and Arts Act; co-operative associations; commercial law relating to farmers; municipal organizations; forms and contracts.

EQUIPMENT FOR AGRICULTURAL DEPARTMENT IN ONTARIO HIGH SCHOOLS.

NOTE.—It is not intended that the equipment listed below is to be immediately supplied, but, in the development of the work, this list may be used as a guide in the purchasing of the school's needs.

In many cases manufacturers will be found willing to put in equipment for demonstration purposes. In other cases, friends of the school will loan equipment. In any case expensive apparatus should not be bought before there is a certainty of a necessity for it.

The High School, in most cases, will be supplied already with a considerable part of this equipment. Where Manual Training work is organized, there will be no need for any new equipment of tools.

GENERAL REQUIREMENTS.

(1) A cabinet, made on some unit system, with drawers or sections suited to holding herbarium mounts, bird skins, geological specimens, mineralogical specimens, fungous diseases, etc., etc.

(2) A large table with drawer and cupboard facilities, suitable for demonstrating experiments. The projecting top should be heavy and finished to withstand water and chemicals. Where water, gas and electricity are available, these should be put in.

ESTIMATE OF COST OF EQUIPMENT.

NOTE.—It is not intended that every school should have all this equipment; local conditions will determine the extent of such.

General:

Land—amount to be determined by local conditions (one acre might be ample)	
Office fittings	
Laboratory tables, etc.	$100 00
Collection cabinets, to commence with	50 00
Library	

Agricultural Physics:	
For Drainage work	57 45
For Weather work	32 75
For Soil work	16 00
For Mechanics	18 00
Chemistry: Same equipment as used in High Schools.	
Farm and *Garden Work*	80 00
Farm Carpentry and *Blacksmithing*:	
For Farm Metal Work	87 26
For Farm Carpentry Work	42 00
Poultry	40 00
Dairy Husbandry	100 00
Entomology	20 00
Botany	60 00
	$702 46

PHYSICAL EQUIPMENT.

(*Numbers refer to catalogue listing.*)

For Drainage Work.

1 Architect's Dumpy Level, for survey work, complete (5017) (Keuffel & Esser, New York).	$35 00
1 Levelling Rod (6252)	12 00
1 Surveyor's Chain, 66 feet (7786 D)	3 20
or	
1 Surveyor's Chain, 100 feet (7786 B)	3 50
1 Home-made Drainage Level (to be made by teacher) Level, $1.25; Wood, 50c.)	1 75
2 Sets Arrows (7811) ($1 a set)	2 00
	$57 45

For Weather Work.

Box, to be made at school (blueprint showing design may be had at the O.A.C.)	$5 00
1 Standard Rain Gauge (330) (Henry J. Green, Brooklyn, N.Y.)	5 25
1 Maximum Thermometer (34) (Negretti & Zambra, Holborn Viaduct, London, England)	5 25
1 Minimum Thermometer (36) (Negretti & Zambra)	5 25
1 Aneroid Barometer (Special 58) (Henry J. Green), to be provided without symbols "stormy," etc., and adjustable ring	12 00
	$32 75

For Soil Work.

2 dozen Zinc Tubes, with gauze diaphragm 1 inch from bottom, for determining water capacity of soil, 7½ inch by 1½ inch	3 50
2 dozen Trays for setting above tubes into, 3½ x 2½ in. x 1½ in. deep	2 00
12 Long Glass Tubes (1 inch diameter, 4 feet long)	7 80
1 Rack and Tray for above	1 50
12 Zinc Trays, 7 x 7 in. x 1 in. deep, for showing optimum water content for tillage and spatulas	1 20
	$16 00

AGRICULTURAL PHYSICS.

For Mechanics.

3 Levers, to illustrate principles of levers	$1 50
Set of Weights for use with above, to be fitted with hooks for attachment to levers or pulleys; 6 of each, ½ oz., 1 oz., 2 oz., 4 oz., 8 oz., 1 lb., 2lb., 3 lb., 5 lb. (Eimer & Amend)	7 50
Set of Pulleys, such as used at O.A.C., Guelph (H. A. Clemens Co., Guelph)	7 50
Model of ordinary pump	75
Model of pressure pump	75
	$18 00

For Farm and Garden Work.

1 Small Scales, weighing ½ oz. up to 240 lbs.	$9 00
1 Truck Scale	....
1 Grain Tester, gallon (W. & J. G. Greey, Toronto)	20 00
1 Set Grain Measures, ½ bushel, 1 peck, 1 gal., 1 qt., 1 pt.	2 50
1 doz. Germinating Boxes, to be made by students, standard size used at O.A.C., suitable for 100 seeds	1 50
1 doz. Zurich Germinators	60
2 doz. Plates for seed testing	1 20
1 Set of Sieves (15) perforated zinc, as per standard at O.A.C.	3 75
1 Air-tight Box, for killing pea-weevils, grain insects, to be made at school	60
1 5-gal. Crock for treating wheat, oats, etc., for smut	50
Collection of grains, vegetables, tree seeds, weed seeds, etc., to be made at school	....
1 Dominion Government Seed Collection	2 00
1 Hand Seed Drill (Planet Junior or New Model)	7 00
1 Hand Wheel Hoe (Planet Junior or Iron Age)	7 00
Spades, Digging Fork, Hoes (Draw or Dutch), Rakes, (flat backed steel), Trowels, Hand Weeders, Garden Line and Reel, Stakes and Labels, Mallet	25 00
	$80 55

For Farm Metal Work.

1 Grindstone, 24 x 3 in. in iron frame	$28 00
1 Anvil, 100 lbs. (Peter Wright)	11 00
1 Small Portable Forge	8 50
1 Ballpein Hammer, 1½ lb.	85
1 Ballpein Hammer, 1¼ lbs.	75
1 pair Flat Tongs	70
1 pair Forging Tongs	80
1 pair Belt Tongs	75
1 pair Gad Tongs	65
1 pair Pick-up Tongs	70
1 Hot Set	65
1 Cold Set	65
1 Hardy	48
1 Swage, top and bottom, ¼ inch and ½ inch iron	65
1 Set Flatterers, 2 inch square	65
1 Top and Bottom Fuller, ½ inch	65
1 Set Punches, ⅜ inch and ½ inch, round	50
1 Set Punches, ⅜ inch and ½ inch, square	50
1 Set Flat Chisels, ½ in., ¾ in.	80
1 7-inch Beck Iron	1 25
1 Set Cold Chisels (1) flat (1) cape	1 00
1 Adjustable Hack Saw, and set of blades	2 00
1 Small Hand Drill	8 00
1 Set S. S. Drills for above, ⅛, 3-16, ¼, ⅜, ½, ⅝ inch	1 00
1 Calipers, outside, 5 inch	55
1 Calipers, inside, 5 inch	55
1 Steel Blacksmith's Square for forge work	85
1 Machinist's Steel Rule	85
1 Rivetting Hammer	50
1 Soldering Iron and Solder	50
1 Set Files, 8 in. half-round bastard, 8 in. half-round smooth, 8 in. flat, 10 in. square, bastard, 10 in. half-round	85
1 Screw Plate (Diamond No. C)	4 00
1 Pair Cutting Pliers	88
1 Vise, 4-inch jaws	6 25
	$87 26

For Farm Carpentry.

Bench and Vise	$10 00
Cutting Tools.—	
Saws:	
Rip Saw	1 40
Keyhole, Compass or Turning Saw	40
Back or Tenon Saw	1 25

Panel	1 00
Metal Saw	35
Chisels:	
¼ in. Socket Mortice Chisel	25
⅜ in. Socket Mortice Chisel	30
⅝ in. Socket Mortice Chisel	35
¾ in. Socket Mortice Chisel	40
1¼ in. Socket Mortice Chisel	55
¾ in. Bevelled-edge Firmer	28
Cold Chisel	5
Planes:	
Jack Plane	1 25
Block or Hand Plane	65
Spokeshave	30
Files:	
Saw, triangular or three-cornered file	10
10 in. half-round	30
8 in. Flat or Mill-saw File	15
¼ in. Round or Rat-tail	15
Boring Tools:	
½ in. Auger Bit	15
⅜ in. Auger Bit	18
Gimlet Bit	8
Auger Bits, ¼ in., ⅜ in., ½ in., 9-16 in., ⅝ in., ¾ in., ⅞ in., 1 in.	2 25
Drill	18
Shears:	
Tinman's Shears	1 00
Cutting Pliers	75
Scissors	75
Marking Tools:	
Tape Measure	2 25
Land Chain	3 30
Marking Gauge	15
Mortice Gauge	60
Scratch or Marking Awl	15
Compasses	40
Testing Tools:	
Try Square	35
Framing Square	1 25
Bevel	35
Level	75
Holding Tools:	
Iron Bench Vise	45
Ratchet Brace	1 50
Monkey-wrench	45
Small Screw-driver	20
Screw-driver or Turnscrew (large)	30
Screw-driver bit	10
Pliers	75
Driving Tools:	
Hammer (claw)	50
Rivetting Hammer	50
Mallet	35
Nail Set or Punch	15
Saw Set	50
Miscellaneous Tools:	
Oil-stone	40
Oil can	5
Putty Knife	15
Belt Punch	10
Glass Cutter	35
Sloyd Knife	35
Can-opener	10
Wad Punch	15

SINGLE BENCH TOOL KIT.

Summary:	
Cutting Tools	$15 05
Marking Tools	6 85

Testing Tools	2 70
Holding Tools	3 75
Driving Tools	2 00
Miscellaneous	1 65
Bench and Vise	10 00
Total Cost	$42 00

For Dairy Work.

	Probable cost.		
1 Barrel or Box Churn, size to suit herd	$3 50	to	$7 00
1 Lever or Roller Worker	2 00	to	5 00
1 Butter Mould, size one to two pounds	45	to	3 00
1 Shipping Box, with icebox in centre and wooden trays	3 00	to	4 50
1 Thermometer (glass)	20	to	50
1 Salt Sieve (hair)	30	to	75
1 Pair Scales, to weigh quarter ounces	3 50	to	5 00
1 Buttermilk Strainer, size 2 to 4 quarts, with perforated tin bottom.	25	to	50
1 Butter Ladle	20	to	40
1 Cream Pail (tin, with handles on sides and tin stirring spoon)	1 00	to	1 50
Creamer Cans and box for cold water (8 cows)	5 00	to	20 00
1 Cream Separator (10 or more cows)	60 00	to	75 00
1 Brush for cleaning utensils	20	to	30
1 Supply of Washing Soda or Borax			
A Supply of good Butter Salt, per sack	70	to	1 60
Butter Color, if thought advisable to use it, per bottle or per gallon.	25	and	3 50
Parchment Butter Paper, per 1,000 sheets	1 00		
Babcock Milk Tester (8 bottles)	1 00		
Lactometer (Quevenne)	1 50		
1 Cow Testing Outfit, such as recommended in Bulletin 12, Dominion Department of Agriculture. There is a probability that the schools may be supplied with these free.			
1 Straightspring Scale (Fig. 1), capacity 40 lbs.	1 25		
1 Sample Bottle for each cow (Fig. 3), each	6	to	10
1 Sample Dipper (Fig. 4), each	10		
1 Box for holding samples (Fig. 5), each	75		
1 Package of 500 Preservative Tablets	75		
	$100 00		

For Work in Entomology.

(Much of this equipment can be prepared at school.)

Killing Bottles, Insect Boxes, Insect Nets, Insect Pins, Insect Spreading Boards, Breeding Cage, Insect Labels, Insect Larva Bottles, Cork	$20 00

For Poultry Work.

1 Incubator	$30 00
1 Brooder	10 00
Models of trap nests, hen houses, etc., to be made by students.	

For Work in Botany.

1 Compound Microscope, 2 objectives	$35 00
Plant Collecting Cans, Magnifying Glasses, Forceps, Razors, Needles, Glass Slides, Cover Glasses, Herbarium Mounts, Labels, Bell Jars, Beakers, etc.	25 00

AGRICULTURAL DEPARTMENTS IN HIGH SCHOOLS AND COLLEGIATE INSTITUTES.

Regulations for Sept. 1907, to July, 1908.

Admission Requirements.

1. Pupils who take the regular two years' Special Course in Agriculture or a partial course therein in a High School, shall be admitted in accordance with the regulations that govern the admission of other High School pupils. For 1907, to 1908, however, other pupils may be admitted who, in the opinion of the Principal of the School and the Public School Inspector, are competent to take up the work. All such pupils shall be regarded as regularly enrolled.

2. To the courses held throughout the county, such persons may be admitted as, in the judgment of the teacher of Agriculture, are competent for the work, whether, for example, farmers or farmers' sons or daughters, or pupils of Public Schools or of other High Schools. A list thereof and their reported attendance shall be kept by the Principal of the school; but they shall not be enrolled as regular High School pupils unless they have been admitted to a High School as provided above.

QUALIFICATIONS OF TEACHERS.

3. The teacher of Agriculture in a High School shall hold the degree of B.S.A. from the University of Toronto, or a certificate of qualification from the Ontario Agricultural College. Such teachers may also take part in the Science work of the school at the discretion of the Principal, provided such work does not in any way interfere with their special work as teachers of Agriculture.

DUTIES OF TEACHERS.

4. Like the other members of the High School staff, the teacher of Agriculture shall be generally subject to the authority of the Board and Principal of the High School, the latter of whom shall control his time-table and have the general direction of his movements.

5. With a view to bringing the Department of Agriculture into closer touch with the farming community and of making it more directly beneficial to them, the teacher of Agriculture shall also act as the local agent of the Department of Agriculture for the district, as follows:

(*a*) He shall visit from time to time the various parts of the county and report upon their special requirements.

(*b*) He shall take charge of an office situated in the High School district, where he may meet the farmers, giving them aid and advice, supplying them with the bulletins of the Department of Agriculture and such other farm literature as may be useful, and discussing with them the latest experimental results of the work of the Ontario Agricultural College.

(*c*) He shall keep in touch with local Agricultural Associations, Farmers' Institutes, etc., and shall act in concert with the staff of lecturers, demonstrators, and professors of the Ontario Agricultural College.

(*d*) Where practicable, he will arrange for excursions for students and others to the Agricultural College in the month of June, and shall take special charge during such visits of those who have been in attendance on his classes.

(*e*) He shall attend the Winter Fair and annual meeting of the Experimental Union, held yearly in Guelph for one week in December.

ACCOMMODATIONS AND EQUIPMENT.

6. A suitable Laboratory and the Equipment necessary to carry out the work as outlined under Chemistry, Physics, and Biology.

Experimental Grounds, separate from the ordinary School Grounds, for illustration purposes in the growing of various classes of farm crops and training in experimental work. The area of the grounds will be determined by local conditions; one acre might be sufficient.

A list of suitable equipment from which Boards may select has been prepared and may be obtained on application to the Education Department.

INSPECTION.

7. The Agricultural Department of each High School or Collegiate Institute shall be inspected at least once each year by an officer of the Ontario Agricultural College deputed for this purpose by the Minister of Education. This officer shall report to both the Department of Education and the Department of Agriculture.

COURSES OF STUDY.

8. The regular Special Course in Agriculture in a High School shall be the two years' one, as defined below. Partial courses may also be provided in the High School for regular High School pupils or for such occasional pupils as may desire them.

9. Regular High School pupils taking the special course in Agriculture shall take in addition the subjects which are obligatory upon all High School pupils, namely, Geography, Arithmetic and Mensuration, English Grammar, Writing, Reading, English Composition, English Literature, and History, with such suitable modifications of

this course, and with such additional subjects, as may be deemed expedient by the Principal and the parent or guardian of the pupil. [See Reg. 39, (4) and (6), of 1904.]

10. It is not intended that all the work outlined in the course below shall be covered in two years. The outline is suggestive rather than obligatory, and the amount of work to be taken up shall be determined by the needs of the community, and the nature of the special subjects selected. In some districts, Horticultural subjects, for example, will receive special emphasis, in others, Dairying, and, in others again, Stock raising, and so on.

11. In addition to the regular Special High School Course, partial courses shall be provided, when needed, in the High School and in other parts of the county, of such duration and character as may meet the needs of the farming community. These may include short courses in Horticulture; Soils, Seeds, Weeds, Farm Dairying, Poultry keeping, etc., as well as demonstrations and lectures in particular subjects (Stock judging, Seed judging, etc.) at one or more meetings at suitable centres. In these courses the teacher of Agriculture will be assisted, when necessary, by members of the staff of the Ontario Agricultural College, and he will be supplied by the College with abundant material for demonstration purposes.

12. High School pupils who take the two years' Special Course herein provided, and whose competency is attested by the Principal of the school and the teacher of Agriculture, shall be eligible for entrance to the Second Year work of the Ontario Agricultural College.

13. The following is the regular two years' Special Course, to be organized in accordance with the requirements of each locality:

(1) *Field Husbandry.*—History of agriculture; different systems of farming; different kinds of soil; rotation of crops; farm crops in their relation to drainage; application of manures; green manuring; preparation of the land for the different crops; methods of cleaning, testing, and selecting farm seeds; study of cereals, roots, fodder crops, grasses, clovers, and other farm crops; sowing, harvesting, preserving, marketing.

Experimental grounds near the school will be used for illustrative experiments with varieties of cereals, grasses, root crops, and in seed selection, methods of cultivation, rotation of crops, and the use of various kinds of fertilizers.

(2) *Animal Husbandry.*—A study of the history and characteristics of the principal breeds of live stock, including light and heavy horses, beef and dairy cattle, sheep, and swine; feeding and management; principles of breeding; registration of pedigrees; market requirements.

Visits to local farms, and practical work in judging stock.

(3) *Dairy Husbandry.*—The herd; formation, care, and management of a dairy herd, rearing of calves; dairy stables: lighting, cleaning and ventilating; individual cow records. The milk: care of milk, elementary chemical and bacteriological study of milk. The home dairy: running of hand separators and care of dairy utensils; manufacture, packing, and marketing of butter.

Visits to local creameries and cheese factories, and a study of factory methods of manufacture, packing, and marketing.

(4) *Poultry.*—The most valuable breeds and varieties of hens, ducks, geese and turkeys, their characteristic points and peculiarities; various methods of housing poultry; incubation, brooding, and rearing of chickens; general methods of feeding and management; market conditions; the fattening and dressing of poultry for home and foreign markets.

(5) *Horticulture.*—Treatment of fruit plantations: cultivation, grafting, spraying; value of cover crops; methods of growing and caring for vegetables; selection of varieties; study of insect and fungus diseases affecting fruits and vegetables; care, storing, and marketing of fruit.

(6) *Forestry.*—Forestry as related to the farm; classification of the common forest trees; the establishment, care, and protection of the wood lot; varieties and methods for roadside planting and shelter belts.

(7) *Agricultural Botany.*—Identification and eradication of weeds and weed seeds; Seed Control Act and its application; experiments to show seed germination and growth of plants; the relation of plants to soil, air, light, temperature, and moisture; systematic study of the structure of cereals, grasses, legumes, and roots; plant diseases: smut, rust, mildew, etc.; how to recognize and combat them; collecting, pressing, and mounting of weeds, grasses; weed seeds for samples in identification.

(8) *Entomology.*—A practical course in economic insects, identification, habits, and life histories; a close study of the more important insects, by means of breeding and rearing cages; insecticides; collecting of injurious and beneficial insects and samples of their work.

(9) *Agricultural Physics.*—Soil: classification and physical examination, origin, and mode of formation; soil forming, soil forming rocks and minerals; behaviour towards moisture. Surveying and drainage: measurement of fields and farms with the chain; calculating areas and drawing plans; use of various instruments for determining levels; preparing plans for drainage; methods of digging, laying of tile, and filling of trench; calculations concerning required size of tile and cost of various systems. Conservation of moisture by drainage, mulching, and cultivation; capillarity and its relation to plant growth. Water capacity of different soils. Mechanics: principles of farm machinery; principles of ventilation, lighting, and heating.

(10) *Agricultural Chemistry.*—Chemical composition of soils; elements used by plants; availability and assimilation of plant food in the soil; application of fertilizers; absorption and retention of important constituents, as nitrogen, phosphoric acid, and potash; insecticides and fungicides; their composition and proper mixture.

ANNUAL REPORTS

OF THE

Dairymen's Associations

OF THE

PROVINCE OF ONTARIO

1907

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE)

PRINTED BY ORDER OF
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1908

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TORONTO.

To the Honourable Sir William Mortimer Clark, K.C.,
Lieutenant-Governor of the Province of Ontario:

May it Please Your Honour:

I have the pleasure to present herewith for the consideration of your Honour the Report of The Dairymen's Association of Eastern Ontario for 1907; and the Report of the Dairymen's Association of Western Ontario for 1907.

Respectfully submitted,

NELSON MONTEITH,
Minister of Agriculture.

Toronto, 1908.

CONTENTS.

Page
Financial Statements for 1907 5
Officers for 1908 6

Dairymen's Association of Eastern Ontario:

President's Address: John R. Dargavel 7
Dairying and National Prosperity: Hon. D. Derbyshire 9
Secretary's Report: R. G. Murphy 13
Addresses of Welcome 14, 29
Farmers' Clubs: G. A. Putnam 16
Cow Testing for Milk Production: C. F. Whitley 18
Cheap Production of Milk: Henry Glendinning 23
Some Agricultural Discoveries: C. C. James 31
Back to the Farm: Hon. Sydney Fisher 34
The Centre of the World: Thos. McGillicuddy 37
A Season's Experience in Montreal: G. H. Barr 39
Quality of Canadian Cheese 44
Report of Chief Dairy Instructor: G. G. Publow 44
Groups of Factories under Inspection 49
Bacteria in Relation to Dairying: Wm. Connell, M.D. 53
Reviewing the Dairy Situation: J. A. Ruddick 58
How to Increase our Output of Milk: J. H. Grisdale 61
Dairy Education: Prof. R. A. Pearsons 67
Montreal Cheese Merchants Talk 73
Rough Diamonds: Thos. McGillicuddy 76
Opening Speeches at the Evening Meeting 79
Address: Prof. R. A. Pearsons 81
Dairy Advance: Hon. Nelson Monteith 82
Resolutions 86
The Creamery Outlook: James Stonehouse 88
Hints to Patrons and Factorymen: J. A. Ruddick 92

Dairymen's Association of Western Ontario:

President's Address: John McQuaker 96
Report of Directors 96
Addresses of Welcome 98
Dairying Abroad: J. A. Ruddick 99
Address: Donald Sutherland, M.P.P. 99
Address: M. D. Schell, M.P. 100
Address: Hon. Nelson Monteith 102
Report of Dairy Herd Competition 105
Developing a Prize Milking Herd: W. E. Thompson 106
Notes on Cow Testing Associations: C. F. Whitley 109
Farm Management from the Dairyman's Standpoint: J. H. Grisdale 114
The Cheap Production of Milk: H. Glendinning 120
Report on Competitions of Cheese and Butter 125
Instruction in Cheese Factories: Frank Herns 126
Instruction in Creameries: Frank Herns 130
The Preparation and Care of Cultures: E. N. Hart 132
Taking Care of Milk and a Clean Factory: J. R. Burgess 135
Practical Cheese Making: Alex. McKay 138
Handling Cheese and Butter at Montreal: G. H. Barr 141
The Producer's side of the Cream Gathering System: Mack Robertson 143
Creamery Systems, Past and Present: Fred. Dean 145
The Butter-maker's Work: E. H. Webster 150
The Cream Gathering Creamery: Prof. H. H. Dean 155
The New Casein Test: T. H. Lund 161
Address: G. A. Putnam 164
Address: Col. James Munro, M.P. 166
Clean Milk: E. H. Webster 167
Food Value of Milk and its Products: Prof. R. Harcourt 170
Presentation of Trophy and Medals 173
The Shepherd of the Soil: G. C. Creelman 174
Address: George Smith, M.P. 176
Resolutions 176

The Milk, Cheese and Butter Act 177

The Dairy Schools of Ontario 181

FINANCIAL STATEMENTS FOR 1907.

DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.

Receipts:

Cash on hand from 1906	$1,442 57
Members' fees	245 00
Grant from Ontario Legislature	2,000 00
Grant from City of Ottawa	100 00
Advertisements in programme	175 00
Total	$3,962 57

Expenditures:

Accounts paid for previous years	$74 00
Executive meeting expenses, January	60 00
Directors' expenses, annual convention, Ottawa, January	471 50
Directors' expenses, Toronto, September	186 00
Miscellaneous expenses at annual convention	85 15
Expenses of local dairy meetings: Alexandria, Almonte, Avonmore, Central Smith, Cold Springs, Elgin, Kemptville, Kingston, Lindsay, Madoc, Napanee, Ottawa, Peterboro, Picton, Smithfield, Warkworth	812 45
Advertising annual meetings and local dairy meetings	234 50
Printing programmes, stationery, etc.	148 25
Postage	45 00
Express charges	14 60
Reporting Convention	110 00
Salaries: Secretary, $300; Treasurer, $100; Auditors, $50	450 00
Butter scoring contest	35 00
Special prizes, Central Canada Exhibition	50 00
Dairyman Pub. Co., calls on stock	150 00
Subscriptions to Canadian Dairyman	171 50
Miscellaneous	15 25
Cash on hand	849 37
Total	$3,962 57

DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

Receipts:

Cash on hand from 1906	$1,120 43
Members' fees, $346; donations, $39.75	385 75
Grant from Ontario Legislature	2,000 00
Money received from prosecutions	1,085 00
Advertisements in programme	155 00
Sale of exhibits	1,553 51
Total	$6,299 69

Expenditures:

Cash paid for exhibits of cheese and butter	$1,475 68
Cash paid for prizes at annual convention	348 75
Inspector: services, $270; expenses, $214.40	484 40
Dairyman Pub. Co., call on stock	150 00
Canadian Dairyman, members' subscriptions	240 03
Reporting annual convention	75 00
Office: stenographer's salary	333 00
Office furniture	32 20
Office rent	117 60
Office expenses	37 55
Telephone and telegrams	83 03
Expenses of annual meeting	259 38
Postage, stationery, printing and advertising	282 17
Expenses of directors	278 28
Expenses of Judges	45 00
Expenses of lecturers	77 10
Auditors' fees and expenses	13 00
Express and cold storage charges	7 30
One-half fines paid to factories	542 50
Cash on hand	1,417 72
Total	$6,299 69

OFFICERS FOR 1908.

DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.

Honorary President, - - - - Hon. D. Derbyshire, Brockville.
President, - - - - - - J. R. Dargavel, Elgin.
1st Vice-President, - - - - Henry Glendinning, Manilla.
2nd Vice-President, - - - - John Singleton, Smith's Falls.
Secretary, - - - - - - R. G. Murphy, Brockville.
Treasurer, - - - - - Jas. R. Anderson, Mountain View.

Directors :

Neil Fraser, Vanleek Hill.
Edward Kidd, North Gower,
John Carscaden, Russell.
John McGregor, Alexandria.
Angus Grant, Moose Creek.
C. F. Whittaker, Williamsburg.
James Whitton, Wellman's Corners.
T. A. Thompson, Almonte.
Joseph McGrath, Mount Chesney.
W. J. Paul, Tamworth.
T. B. Carlaw, Warkworth.
G. A. Gillespie, Peterborough.
G. G. Publow, Kingston.
Jas. A. Sanderson, Oxford Station.

Auditors :

F. W. Brenton, Belleville.
J. A. Kerr, Belleville.

DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

President, - - - - - Jno. Brodie, Mapleton.
1st Vice-President, - - - - J. J. Parsons, Jarvis.
2nd Vice-President, - - - - Jno. H. Scott, Exeter.
3rd Vice-President, - - - - Wm. Waddell, Kerwood.
Secretary-Treasurer - - - - Frank Herns, London.

Directors :

Geo. A. Boyes, Putnam.
J. N. Paget, Canboro.
S. R. Wallace, Burgessville.
D. A. Dempsey, Stratford.
J. B. Smith, Alton.
W. S. Stocks, Britton.

Auditors :

J. A. Nelles, London.
J. C. Hegler, Ingersoll.

Representative to Canadian National, Toronto, Robt. Johnston, Woodstock.
Representative to Western Fair, London, - - Geo. M. Mackenzie, Ingersoll.

Dairymen's Association of Eastern Ontario.

ANNUAL MEETING.

The thirty-first annual convention of the Eastern Ontario Dairymen's Association was held at the town of Picton on Wednesday, Thursday, and Friday, January 8th, 9th and 10th, 1908.

It can be truly said that this was one of the best dairy conventions ever held in the Dominion of Canada. The attendance was so great at nearly every meeting that numbers of people had to be turned away. The people of Picton did everything in their power to entertain the visiting dairymen. The regular sessions were held in the Parish Hall, and the evening sessions were held in the First Methodist Church.

PRESIDENT'S ADDRESS.

By John R. Dargavel, M.L.A., Elgin.

It is with pleasure that I vacate the chair for our esteemed Honorary President, Senator Derbyshire, who has so recently been made a Senator; and whilst I wish to congratulate him on having been thus honored, I also wish to congratulate the Premier of the Dominion and his cabinet upon having displayed good judgment in coming to the Eastern Ontario Dairymen's Association to make the selection; and I would further remind them that among the various other callings of life can no greater number of men of ability be found to fill such responsible positions than among the dairymen of Canada.

I also wish to express my pleasure at the holding of the convention, at this time, in the historic town of Picton, in Prince Edward County, where, I am informed, the dairymen have responded to the instruction given, and have made as great, if not greater improvement, than any other county in Eastern Ontario.

I desire also on behalf of the directors of our Association, to thank you for the cordial reception extended to us, and for the assistance given by the local committee to our secretary, Mr. Murphy, in making the preliminary arrangements for this meeting, and to your town council, your county council, your bankers and business men for their financial aid in bearing some of the expenses incident to the holding of a meeting of this kind.

We are here in convention to-day to look over the work of the year just passed, and to plan our work for the future. No dairyman, who keeps cows for profit, can close up his business for the year any better than by attending meetings of this kind and learning (through the experience of others) of the mistakes he has made. Neither do we know of any more profitable way for him to commence the new year than by attending this convention, and through an interchange of ideas and experiences lay the foundation and assist others in laying the foundation for a successful business in 1908.

An Association of this kind means organization and an organized effort, the influence of which has been good. It has been the means of building up dairy sentiment, and of diffusing dairy information and knowledge, and it has worked for the advancement of the dairyman's interest.

It has proved itself worthy of your support and the co-operation of all those who have a direct or kindred interest. I hope and in fact I am looking for a good attendance at each session during the three days we are with you.

Our meeting here is for educative purposes, and I hope it may fulfil the mission for which it is held and be profitable, not only to the dairmen of Prince Edward County, but also to the whole of Eastern Ontario.

We regret to say that the dairy season of 1907, as far as the export movement is concerned, has been disappointing, the exports of both butter and cheese showing a marked falling off from those of last year, as well as being considerably short of the average of the past few seasons. The aggregate value of Canadian cheese and butter exports for 1907 will be, in round numbers, about $23,000,000, against $29,000,000 for 1906.

The small make of cheese this past year, compared with previous years was, no doubt, due to the very late spring and the poor pasturage during the season. Throughout all of Eastern Ontario the season was very backward, owing to the continued cold weather, which retarded the growth of grass. Towards the close of the season, the make was also reduced by the cold, wet weather coupled with the shortage and high prices of food which is used at this time to keep up the flow of milk. Feed was so scarce that many farmers sold some of their stock at a great sacrifice. In our opinion, this state of things could have been remedied, and I am looking for some of our speakers to deal with this matter in some of their addresses.

We are pleased to be able to say that through the Dairy and Cold Storage Commissioner's branch of the Department of Agriculture, at Ottawa, we have been able to get better carrying facilities and our cheese have, in consequence, reached their destination in better condition. This, together with the improvement of quality and the shortage of make, has kept the average price of our goods for the season of 1907 in excess of the previous year.

The improvement of quality has been brought about by the untiring energies of our chief instructor and sanitary inspector, G. G. Publow, who with 24 competent men under him have kept a close surveillance over the sanitary production of the raw material and its skilful manufacture into cheese.

Among the new lines of dairy work recently inaugurated, was the holding of special dairy meetings in each of the districts represented by the various directors on our board. About twenty of these were held in the months of November and December, and were addressed by the local director, your President, Honorary President, Secretary, Henry Glendinning, Geo. W. Barr, official referee, and N. G. Somerville. For the services of the last two named gentlemen we are indebted to our friend, J. A. Ruddick, Dairy Commissioner, at Ottawa, and on behalf of our Association, I tender thanks to Mr. Ruddick for sending to our aid these two men, who were so acecptable to the people. The meetings were generaly well attended, and the results have been such as to warrant a continuance of this means of carrying information to the patrons in districts that do not come so directly under the influence of these large conventions.

Another matter which has contributed in a large measure to the improvement in quality of our goods has been the fact that the Government took upon itself the entire cost of instruction and inspection, and in so doing saved for the dairymen of Eastern Ontario about $15,000, and made it possible for our inspectors to reach a large number of poor factories which heretofore had escaped inspection and instruction.

All of these things have combined to make our work of use to the dairymen of the eastern part of this Province, but I am sure that I voice the opinion of each of the directors of this Association when I say that were it not for the liberality of the Department of Agriculture for Ontario, of which the Hon. Nelson Monteith is its Minister, this educational work could not be carried on. We appreciate the aid he has given us, and whilst he has looked well after the varied interests of the agriculturists, as a whole, we are pleased to know that the dairy industry of Canada, which takes rank among those of most importance, has not suffered at his hands.

This Association has for its object the furthering of the interests of the dairy industry in all its branches in the eastern part of the Province. It is true, we have not yet reached the goal of perfection, but each year shows improvement along some line, and these gatherings (such as I expect this to be) contribute in no small degree to the success of the good work. It is here we can compare notes, and get fresh enthusiasm from coming in contact with men who have overcome difficulties similar to those which confront us. It is here we can listen to men of distinction who are willing to contribute of their acquired knowledge to us.

I am not going to prolong this address, as I may have something to say from time to time as your President; but in conclusion I am going to predict that with the short make of this past season, with the markets bare and with the improved quality we can fairly hope for increased prices this coming season.

I also wish to say that the board of directors and officers of this Association with whom I have been associated during the year just passed have given you their best service, and all that has been done has been done with a view to the upbuilding of this great national industry.

DAIRYING AND NATIONAL PROSPERITY.

By Hon. D. Derbyshire, Brockville.

I want in the first place to congratulate you, Mr. President, on the marked ability which you have displayed in the year 1907. You have given careful attention to all matters pertaining to the work of bettering the conditions of the dairymen in Eastern Ontario, and as one of the representatives of the Local Government, you have been on the floor of the House and have been of great service to dairying in such a conspicuous place as you have occupied in the Legislature. I was particularly delighted with the work you did there in connection with the Eastern Dairymen's Association. The $15,000 that you got from the Government to relieve the factories of the $15 that each paid for the use of an instructor was a great advance, and something which the eastern dairymen have been trying to get for years. We could never bring the Minister of Agriculture to the point of granting it. There never was a Minister of Agriculture that for half a minute could argue against the granting of this money. Why should not the dairymen have free education the same as the schools? Why should not this great national industry have free education?

We feel particularly pleased with our reception in Picton. We have received a warm welcome from the mayor of the town and from all the people, and they have done everything they could to make these meetings a success.

We have been particularly pleased with the new step we took of holding meetings throughout the different districts in Eastern Ontario. It was really a great step in advance. We are under a great debt of gratitude to Mr. Ruddick, Dairy Commissioner, for the assistance he has given us, and I would like to mention Mr. Barr, the official referee at Montreal, and Mr. Somerville, and also Mr. Whitely for the work he has done in connection with the Cow Testing Associations. This has been a great benefit to the farmers of this Dominion.

The $6,000,000 that we have lost this year means hard times, means stringency; it means that every industry in our land is crippled because the dairymen did not do the business that they should have done. You can see the importance of the dairyman to this Dominion. You see what it means to the people of this country for the dairymen to stand to the front and do their work properly. It means that every spindle in every factory, every merchant, every manufacturer, and every business man in the Dominion will be benfited if the dairymen are prosperous. What was the trouble when, last year, we made $6,000,000 more money than we ever made in the history of the country. Didn't it mean that every industry in 1906 was prosperous; didn't it mean that the merchants were doing more business than ever before; didn't it mean that the manufacturers had more orders than they could fill, and every industry in the land was flourishing on account of the progressive dairymen who had put their cheese and butter and bacon pig on the market and had brought $6,000,000 into the country?

This is the commencement of 1908, and we ought to lay our plans for growing feed of a better quality, and to see that we do everything in a proper way so that our cows can be fed. We ought to put up a silo if we have not got one, and we ought to set aside feed for 1909. Do not make any mistake about that. The man who had a silo last year for the dry weather had feed in May, when there was no grass for the cattle, and he could keep them right up in the condition they should be in. If we are going to lead as we have been leading we must provide for dry weather and we must keep everything in the very best condition. If we can educate the men and get them filled with enthusiasm here and make them understand that, then when they go home they will be prepared for new active work in the direction of better dairy work. If we can have them feel that there is something in the business, so that they will take hold and get a better cow and provide fodder so that she can be fed all the year round, no matter what happens to the pasture or weather conditions or anything of that kind; if we can have our stables so built that they will be comfortable any day of the year, then we will produce more butter and cheese in this country and everybody will be prosperous. What we want is more and better feed. You should not try to see how little you can feed the cow, but you should encourage her to eat more and more.

Never in the history of Canada was milk so scarce. There was never a time in the history of Canada when milk was worth as much as it is to-day. There never was a time when there was a greater demand for milk and butter and cheese than there is to-day. And why don't we produce it? Why don't we take hold of this business in a business way, and see that we have these things provided so that we can place ourselves in the condition of being intelligent people and build up this Dominion on account of our intelligence and thoughtful work in connection with this great national industry?

Sometimes it is very discouraging when we go to certain sections as we did this year and see the factories in such poor condition. We see some old factory with the same old leaky roof, and the same old boards on the side where the wind can whistle through, and you can see the leaky floor where you can look right down into the dirt and mud the same as you could years ago. Is not that discouraging? We want better factories in some sections, and one of the great benefits of these meetings that we held in the different sections was that we took up these matters where they were most needed and discussed them. We had a slick lot of speakers, right up-to-date, and they understood what to do, and they did it in a nice, intelligent way.

I agree with what you say in regard to the Province of Ontario and the Minister of Agriculture, and I am delighted that he has taken hold of our dairy work and assisted us and co-operated with the Eastern Dairymen in the way he has since he has been Minister of Agriculture in this Province. He has given us a larger grant and given us the power of bringing this education so easily to the people. I am delighted that this has been done, and I am pleased that he is going to be here to-night to speak for himself and give us the assistance and co-operation and words of direction and wisdom for 1908.

If we had a man in every home who was filled with dairy enthusiasm, about the selection of the best cow and testing it and the production of a larger and better quality of milk, we would make greater strides than ever before. What do they do in some of the localities? They sit around the house, and when you go and talk to them about milk for next year they are not decided whether they are going to send any or not. They are going to find out if they cannot get it drawn for nothing, down to the other factory. They are going to find if they cannot get a little off the price of manufacturing. They are trying to pare down here and pare down there, and make it so that the cheese-maker cannot make a silver dollar all summer. That is not the way to make him do the best work for you. That is not the way you are going to get enthusiasm in connection with the production of a finer quality of cheese. Walk right to the front, and go down and take the cheese-maker by the hand and let him know you are going to send more milk of a better quality, and that you are going to give them assistance and co-operation throughout the year. Stay by him, and make that factory the factory of the locality on account of your warm sympathy and your hearty co-operation. If you will do that, every factory will come right to the front, and you will have a man in charge who will be an educative power in the community.

The Dominion Government have done everything in their power to carry these goods from the station to the Montreal point of shipment, under the best conditions, and they have provided refrigerator compartments in the ships so that our goods can be delivered to the English market in a fancy condition. All that has been done to give assistance and co-operation, and all we lack is the man on the farm and the man in the factory to co-operate with us in connection with this.

The Ontario Government has given us money and provided us with a means of educating the people, and they have done it cheerfully. They have done all they could to assist us, and it is for us to turn right in with them and with enthusiastic vigor take hold of this work and make 1908 the great year in connection with dairying. Do not be satisfied in an increase of $6,000,000. but make it $10,000,000, more than we ever had before, and that will mean prosperity in every part of this Dominion. That will mean that everybody will have more money; there will be more money in the land, and there will be no stringency, provided you make it ten million dollars.

You should be ready to take care of your cattle, so that if it does not rain the day you expect it to you will have the feed on hand. Make a study of the feed question during 1908.

You refer to the hearty co-operation you receive from the Secretary and Treasurer in connection with this work. I may say that for several years I knew we had the best men we could get; they were the right men in the right place all the way through, and they have always been in hearty co-operation in connection with carrying on the work, and they have done everything they could to carry on the work. We feel proud of the Board of Directors we selected this last fall; they are enthusiastic in their several localities. With regard to our Secretary, I must say he is untiring in his efforts. Our Treasurer also has been untiring in his efforts to get everything put in the best shape for this convention.

I predict that we are not only going to have better prices in the immediate future, but we are going to have a better class of cheese. We are going to have a better quality of milk and a larger quantity, and we are going to have more enthusiasm in connection with the dairy work in 1908 than we ever had before. We are going to Brockville next year. Cornwall and other places also want us, and I do not blame them.

Now I want you all to go home and make up your minds to do better in 1908 than you ever did before. See that the cows get plenty of ensilage made from corn that has been well hoed and with plenty of ear on it. Have plenty of health and vigor in your stock. Get a good field of alfalfa, have some sugar beet roots to keep the common health, the same as you have for yourself. Cows are very much like the ladies, if you take care of them and make a little fuss over them, they will be swift to attend to you. You can have a woman walk right up with a smile on her face if you just let her know that she is a little better than another woman, and that she can do a little better work than anybody else; and you can make a cow believe that also by kind, careful attention. (Applause and laughter.) See that she gets good light, plenty of food and the best of water. Remember that 89 per cent. of the milk is water. See how much food you can get her to eat in 1908, and how much milk we can produce, and make the dairymen of Canada a power in the land on account of the progressive work we are going to be able to do during this year. (Applause.)

COMMITTEES.

The following committees were then appointed:

Nominating Committee: Hon. D. Derbyshire, Henry Glendenning, James Whitton.

Business Committee: T. B. Carlaw, James Anderson, John Henry Singleton, T. D. Thompson, Edward Kidd.

Legislation: J. R. Dargavel, M.P.P., Hon. D. Derbyshire, R. G. Murphy, G. G. Publow, John McGregor.

Committee on Resolutions: R. G. Murphy, T. A. Thompson, J. H. Singleton.

SECRETARY'S REPORT FOR 1907.

I have pleasure, as your Secretary for 1907, in presenting my report.

The eastern part of the Province of Ontario being more naturally adapted to dairying than grain growing and other branches of agriculture, the farmers are therefore almost exclusively engaged in that branch of business, coupled with hog-raising, which is an adjunct of dairying.

About forty years ago (in 1867) the first Dairymen's Association was organized at Ingersoll, and was known as the Canadian Dairymen's Association. This Association held all its meetings in the west (mostly in Ingersoll) and after ten years of successful work it was found necessary to divide the Province into two parts, and have two Associations, the one to be called the eastern and the other the western; Yonge Street, Toronto, being the dividing line between the two. The first annual convention for the eastern part of the Province was held at Belleville, on the 21st and 22nd, February, 1878. To-day we are holding our 31st annual convention, and a comparison of the exports of that date with the year just passed shows the exports of cheese to have increased as 1.5, or the year 1907 to have exported five times as many cheese as thirty years ago.

The early work of our Association was devoted almost exclusively to educating the cheesemaker and not the patron, but since the establishment of a Dairy School in our midst, the Association has been bestowing considable attention to the education of the milk producer. The patron is being instructed regarding the proper selection of a dairy herd, the proper feeding of his cows, their proper care and the proper care of his milk.

The Association was unusually active during the year 1907 in looking after the dairy industry. The sanitary conditions of the various cheese and butter factories as well as the surroundings at the farm, were dealt with, and for the first time instructors were made sanitary inspectors, which gave them power to enforce cleanliness both at the farm, where the milk is produced, as well as at the place of manufacture. The results of the work done by these men can be plainly seen all over the eastern section.

The new constitution and by-laws, which were submitted at the last annual convention, and which met with your approval, were later submitted to the Honorable the Minister of Agriculture and were sanctioned by him, so we are now working under the new constitution.

One of the most important changes made in our Association work was a greater representation upon our Board of Directors. This necessitated the division of the eastern part of the Province into eighteen districts, in each of which a special dairy meeting is held at some point, which is determined by a committee appointed for that purpose. The committee appointed for this purpose last year consisted of Mr. Putnam, Dairy Director; G. G. Publow, Chief Instructor; President Dargavel, and your Secretary. At these district meetings a representative is selected by the dairymen in attendance. These selections are approved by the Association, and thus the Board of Directors are elected for each year. This increased representation has been in force only this last year, and has worked very satisfactorily.

The membership for the year 1907 was 245. This number is much less than it should be. With the territory it covers and with the number of persons under its jurisdiction there should be a membership of at least as many thousands as we now have hundreds. It is very difficult to get dairymen to realize this, and unless a personal canvass is made I do not see how the number is going to be materially altered. Each one who becomes a member will receive the *Canadian Dairyman,* the only paper in Canada devoted exclusively to dairying, during the year 1908. The Provincial Government has done well in assisting the Association, and the patrons of every factory in eastern Ontario should become members, which would immensely increase the power of the Association.

There never was a time in the history of the trade, when it was more necessary to be alive to our own best interests, and not only guard the position we now hold, but to get a step higher each year. If by our carelessness or apathy we should lose the position we now hold, or allow others to occupy a more exalted one, the dairymen of this Province would sustain a severe loss.

Some new work along dairy lines has been introduced in a few of our factories this past season. I refer to the manufacture of butter from the whey. This has been in operation in a few of our factories, in the Brockville district, during this past year but as it has not yet become general this Association is not yet prepared to recommend it.

We have, however, looked into the matter far enough to confidently say that small cheese factories cannot add a plant and manufacture butter from the whey at a profit.

We wish to call your attention to the fact that the office work of your Association has greatly increased especially the correspondence. We have also endeavored to keep the interests of the Association and the important features of dairying before the public, by means of the press. We have prepared a number of special articles in the interests of dairying for papers having a circulation in dairying districts with a view to creating more enthusiasm among our dairymen in the work in which they are engaged. We trust that our efforts in this and other directions will meet with your approval.

Before closing this report I wish to convey the sincere thanks of the directors and members of this Association to the Hon. Nelson Monteith, Minister of Agriculture, for his recognition of the Association work by making a liberal grant to meet the expenditures, which the work entails.

Thanking the directors and the members of the Executive Committee for their kindness, during the year.

I remain,
Your obedient servant,
R. G. Murphy,
Secretary.

ADDRESSES OF WELCOME.

Mayor Farrington: On behalf of the corporation of the Town of Picton, I am pleased to welcome you. I feel, this is one of the proudest moments I have had since I have had the honor to be the Mayor of the town of Picton. I have presided at many functions during the last three years, but I can assure you, the members of this Association, that it is the greatest pleasure I have had during my term in office as Mayor. I also feel proud that I have the honor of presiding, because in my earliest days I was associated with this great industry. I believe this country has made greater strides than any other county of Ontario in the production of cheese. The citizens of Picton feel especially interested in the county surrounding our town, and we are glad to see the farmers prosper. I am glad that I was instrumental in having you hold your convention in our town, although I believe it was mainly through the efforts of Mr. Anderson that we at last procured your attendance. After telling of the local enterprises and advantages of Picton, and giving the delegates "the freedom of the town," the Mayor resumed his seat amidst applause.

M. T. G. Wright, on behalf of the Picton Cheese Board, read the following address of welcome:

On behalf of the Picton Cheese Board and Dairymen of Prince Edward County, I extend to you a right royal welcome.

We as dairymen are proud of the high standard that Canadian cheese has taken in the British markets, and the important position it holds in the commerce of this great nation, and are well aware that it is through the excellence of our output that we have attained our exalted position. While, in order to reach this, the individual cheesemaker and dairyman have been the most important factors, yet we realize that it is through the channels of the Eastern Ontario Dairymen's Association that we have derived our education.

We consider it an honor and a great privilege to have you hold this your 31st Annual Convention in our town. Could it have been held during the summer season, we would have been pleased to have shown you some of the fine natural scenery of our county, which we consider is not surpassed by even the far-famed beauties of the old St. Lawrence.

We expect to reap a great harvest of information from your presence among us, and hope that by our hospitality we may make your visit a pleasant one.

President Dargavel made the following reply: I am sure we would be less than human if we did not feel gratified at the cordial welcome and very kind words which have fallen from the lips of your Mayor and from the President of your Cheese Board. I am sure that every director and member of our Association has been more than pleased with the reception we have met with in the historic county of Prince Edward. We who have not had the pleasure of visiting this place before have been very much impressed with the appearance of your country and also with the beauties of your little town. I am sure that the citizens of this town may feel very proud of their institutions, their places of business, and their manufactures. I had the pleasure of visiting one of the leading stores of this town, and knowing something about business myself I was struck with wonder that in a town of this size, that you would have a place of business of the magnitude which I saw here. It would be a credit to a city of fifty thousand inhabitants. (Applause) And that shows me as a business man that you must have something back of this and that you must have a prosperous county; because when all is said and done it is the farmers who keep up the town. The wealth comes from the soil, and if you have intelligent farmers, you are bound to have wealth. I am afraid we have been folding our arms in Leeds and resting on our laurels, because I know as a matter of fact the dairymen of this county have been making greater progress than we have. (Applause.) We were one of the first counties to take up the manufacture of cheese in factories; in fact we contend that the first cheese factory ever established in Ontario was built in the County of Leeds. We do not feel at all jealous of you people, but we would like to emulate the progress you have made.

I am sure that after our visit here, and after hearing the addresses which will be given by some of the noted dairymen and some of the best speakers that are to be found in the Province of Ontario or in the Dominion of Canada, you will be greatly benefited. We feel honored that we have with us not only the Minister of Agriculture for the Province of Ontario, but also the Minister of Agriculture for this great Dominion. These are two men to whom the dairymen of this country owe a debt of gratitude. They have both been in the past, and I am sure they will be in the future, friends of the dairymen of this section. When the question was first mooted of holding this convention in this town we listened to it with some misgivings, from the fact that we did not know just how easily we could reach Picton. I attempted to get here one time last spring but did not get further than Trenton that evening, and not being able to charter a special train I had to go home; but on this occasion after the cordial welcome we have been receiving the question is whether we will be able to get away from here or not. (Applause).

On behalf of the Dairymen's Association, I thank you for the very cordial welcome you have given us, and we will do the best we can to lighten the services of these two constables you have in the place. (Laughter) I thank you very much for the kind words of wecome we have received.

FARMERS' CLUBS.

By G. A. Putnam, Director of Dairying, Toronto.

I can truly say that I am delighted with the proceedings so far. It is with pleasure that I meet with the members of the Dairymen's Association, in Picton. I had the pleasure of visiting this county once before, when I was entertained by our good friend Uncle John Hyatt, and since coming here to-day I have learned so much as to the superiority of your dairying methods that I believe it would be a very good thing for the Superintendent of Farmers' Institutes and the Director of Dairying Institutes to come here and spend a month or so.

One is moved to admiration for your Association when we listen to the splendid addresses given by the able men you have in office, and when we note the readiness with which the cheesemakers enter into the discussion, and I have no doubt this afternoon will be productive of great good. There is a unity of spirit among the dairymen of the Province for the one object that we have not had before. I think the instruction work this season has done more to bring the manufacturers and owners of the factories and the producers of milk together than anything else. We have two splendid men in charge of dairy work in this Province, Mr. Herns in the west and Mr. Publow in the east. You would have some difficulty in equalling these two men were you to search the continent over. Your Association must be congratulated upon the advice given the Department last year that some re-organization must take place in dairy instruction work, whereby we would be able to reach all the dairymen. In the past we asked the factory to make application for instruction. This year, by an additional appropriation, from the Department, and at a loss of revenue of $12,000, we decided to have the whole district put into groups and put men over each group, thus bringing every factory under the influence of the instructors; and the result has been that between 175 and 180 factories which had never before been visited by instructors have received the benefits of this instruction this year. I think our cheese instructor, Mr. Publow, will tell you that in Eastern Ontario these factories are coming now to appreciate that the efforts of the Department and the Association are first and always to benefit the producer, the maker, the owner of the factory, and all connected with the industry. The reports received by the Department have not been voluminous, but we are more than satisfied with the manner in which this instruction has been received, since every person practically is impressed with the idea that this work is for their benefit, and they are now in a position to support the Department in being a little more vigorous in its efforts to enforce a law which we already have regarding sanitary work in connection with the production and manufacture of cheese.

I do not think we can do better than work along the same lines and be a little more aggressive. Dairy instruction was pushed this year with more energy. The sending of the inspectors to the annual meetings of the factories had good effect. Attending conventions such as you have here, or any other large gathering, has not as good an influence as the sending of a man back among the farmers. At these meetings held at the cheese factories they meet with people who have never had an opportunity of listening to addresses such as you have heard. It is one of the problems of the Department to know how to get these men out to attend meetings, and we thought if we sent speakers to the annual meetings of the factories we would get hold of a large number of men who have never yet taken advantage of the opportunities afforded. If something is going to take place which affects the pockets of a man the next year, then we will get that man at the meeting, and we stipulate that the speakers sent out should be given an opportunity before the business is finished for from a half to three-quarters of an hour. Thus we force these men to listen to the instructions; but we must say they have shown their appreciation of the work, and it is one of the best works we have yet undertaken. Already over two hundred annual meetings have been attended in eastern Ontario, and during January and February we expect that between five and six hundred meetings will be attended. We believe that the owner of the factory and the cheesemaker should co-operate with the patrons.

The work of the Farmers' Institutes covers a very wide field, and in sending speakers out to Eastern Ontario we always see that one member of the deputation is a dairyman. I well remember the first convention I attended in eastern Ontario. I was taken to task by Senator Derbyshire for having sent a poultryman to attend some Institute meetings in Eastern Ontario. "Young man," he said, "if you ever send a poultry man down to Eastern Onario again you will hear from us. We want dairyman first, last, and all the time." That is to a certain extent true; but is it not true that we ask ourselves whether or not we want something else? We still have undesirable milk at some factories in spite of the 65,000 circulars sent out from the Department, and in spite of the instruction which has been given. These are conditions which you must look at and remedy. One means of remedying this will be for the farmers to form clubs. You can call them factory clubs or farmers' clubs or Institute clubs. You want some sort of local organization which will take upon itself to call the farmers of the locality together and discuss their own business in their own way. I speak very earnestly regarding this matter, because in looking over the history of agriculture in Ontario we find that the great majority of these men who have been prominent in these matters during the past decade have been men who in their youth had the advantage of local organizations. The Hon. John Dryden and the Hon. Nelson Monteith both had these advantages, and such men as Thomas McMillan. Mr. Rennie and others tell me they attribute their success largely to the fact of their being a member of some local organizations.

The Department has issued a little leaflet upon the foundation of these clubs. I shall not detain you to give you particulars, but will only say that all that is essential is that some leading person in a community should invite his neighbors to go to the schoolhouse or township hall and form a little organization for the studying of their own problems. Unless you have these clubs you cannot get hold of the men who need improvement in the locality. One other reason why I am very sanguine of the success of Farmers' Institutes clubs is the success which has attended the Women's Institute work in Ontario. In four or five years they have grown from a membership of 2,000 to 11,000. Meetings are now held at four hundred different points throughout Ontario. I believe the farmers of Ontario would derive great benefit from the formation of these clubs (Applause.)

COW TESTING FOR INCREASED MILK PRODUCTION.

By C. F. Whitley, Dairy Commissioner's Staff, Ottawa.

There can be no doubt in your mind that this is a most important subject to bring before a convention. You will have noticed that every speaker who has so far addressed you from this platform has mentioned Cow Testing Associations. That alone is proof positive that it is an important subject, and, still more, one that is coming readily and forcibly to the front. I am very glad indeed to be at this convention. It is not my first trip to this county for I have pleasant recollections of two trips here.

With regard to our Association we are very glad to report it. Roughly speaking, we have three times the number of Associations that we had in 1906. We had 52 Associations representing about 870 herds, and taking over 9,000 cows that were being recorded right through the season and there was very much more interest manifested in the work this year than previously. More interest has been evidenced by the fact that they have been more willing to come to the factory, or wherever the testing is being done, and talk over matters connected with dairying. That brings to my mind the fact that perhaps it is better to have the milk hauled by one member of the family because enthusiasm is then stored up by him.

The great oustanding advantages of cow testing work may perhaps be divided into three parts: a comparison between herds in the same district; between yields in other districts by herds, and then between individual cows in the same herd. I find so many men who totally misunderstand what we are driving at. The mere fact that a cow's milk is weighed does not make that cow give more milk. The object of the cow testing work is to ascertain the exact yield in order to develop a strain of cows that will give a large quantity of milk. Take our records for October last year. We found in Victoria county that 54 cows gave a total record of 19,000 lbs. of milk. In another district twice the number of cows should have given 38,000 lbs; but instead of giving that quantity, we find that 106 cows gave just 65,000 lbs. of milk. That means that 100 cows in one locality are doing the work that 175 cows are doing in another locality. In one section they are still looking for the dual purpose cow, and I do not think she is a profitable dairy animal.

Q.—What do you mean by dual purpose?

A.—Plenty of milk and plenty of beef.

Q.—You have not found that yet?

A.—No, I have not. Some claim that they have, but I have not. In one district the dairy business is treated the same way as poultry are treated. It is being left entirely to the women of the house, simply as a side line. They are not into dairying for profit, but they seem to be content with a little milk and butter and cream to use on their own table.

You will find similar things in practically all our fifty-six Associations. At Cownsville, Quebec, 165 cows gave 80,000 lbs. of milk in August, and in another Association not one hundred miles away were 29 cows giving 19,000 lbs. more milk. This is the kind of work we are trying to tabulate, to bring home to you the desirability of dairying in properly carrying it on. These men are feeding for profit, and are weeding out so as to work only with the profitable cows. Over and over again we have found ten cows doing the work of twenty. Fancy what that means, striving the year around with ten cows that are certainly not worth their keep. Ten cows in one district gave 9,500 lbs. of milk; ten cows in another district gave only 7,500 lbs; and 100 cows are doing the work that it takes 218 cows to do over in another district. I found in one district all the cows average 2,900 lbs. of milk and 100 pounds of fat. The farmer was feeding chop all summer, and his neighbor was feeding sixteen cows, and only secured 2,200 lbs. of milk. If they had been as productive as all the cows of his neighbor he would have had 11,000 lbs. more, which would have given him $102 more money for his four months' work. I went over the figures of these nine cows thinking I might get something of interest, and I found that practically half the cows were below the average yield. Roughly speaking, we have in Ontario a million cows, and if half of them are below the average see what it means to the country. It would mean another $3,500,000 in the farmers' pockets if they were brought up to the average. It is not a question of price at all. It is a question of selection and bringing these animals up to the average weight of milk; and that doesn't begin to touch the possibilities that might be accomplished if these good cows were still further improved. It is a question of $3,500,000 more if the cows below the average were simply brought up to the average. In many of the Associations there were scores of cows that went 108 lbs. below the average, emphasizing the need there is for this work of weeding out the poor animals and of making improvement by selection. The average crop of oats in Ontario is about 40 bushels per acre, and the seed growers in 1900 secured an average of 54 bushels instead of 40 and 59 bushels the next year, and in 1902, 73 bushels per acre.

Take the question of good and poor cows in the same herd. For eleven months last year we had thirteen cows whose records were complete for the full eleven months, and the average for the eleven was 3,886 lbs. of milk and 180 lbs. fat. The four best cows gave 4,562 lbs. of milk and 216 lbs. lbs. fat. The four poorest gave 2,721 pounds of milk and 135 lbs. of fat. The average difference was $26.40. Cut that in two; then cut it in two again, and then take off a dollar, and it makes a difference of five million dollars in the Province of Ontario. There are some dairymen who are content apparently to milk a cow nine times in order to get one cent profit. We do not claim that every farmer should have a business college course, or should be a chartered accountant, but I do wish to say that I do not consider the methods of modern dairy farming complete. In fact they are lamentably deficient. There should be some simple system of recording everything in connection with the farming operations, and if that is true it follows far stronger that it should be so in connection with every cow in the herd. It is said by horticulturists that no two leaves of any tree are alike, and there is a wonderful difference between animals of the same breed and in animals of the same herd. I can point you to two sisters, calved at the same time in the spring, and giving totally different yields at the end of the season. The owners cannot account for it except that nature seeks variety and will have it. If this is so, it is most important to get at the possibilities to each cow in the herd. You do not expect to get very rich milk from a Holstein, yet we have on our records a great many testing from four per cent. right straight through the season. If this be so, why are men content with two per cent.? One cow twelve years old, calved in 1906, gave in the eight months, beginning in January, 863 pounds every month. I wrote to the owner to ask what special treatment she was getting, and he said she was getting no special treatment but she comes of good milk stock. Selection pays and blood will tell. (Applause.) I noticed many cows dodging about in their weights, up one time and down another, and up again, and I wrote to find out how it was; and they all replied in the same way "We can't account for it except the change of milkers." There should be a sympathy between the milker and the animal. Don't look upon milking as a chore, but look upon it as a real profitable work. There is a great room for improvement in this matter of maintaining the milk flow for a long period. In one herd the cows calving in the spring gave only 500 pounds by September, but there were animals in the same herd giving nine hundred and a half pounds and eleven hundred pounds of milk and they are the ones to select to breed from. You will have noticed that dense population and a high development of industry and a high development of agriculture must go hand in hand; they are inseparable. The market gardeners collect in the suburbs of our cities. Close around the city of Paris there are 2,000 acres rented out for $150 per acre rent, and there are market gardeners there who are selling produce to the value of $1,000 per acre. That income is not due to high prices of early vegetables, but is due to the enormous crops of plain ordinary vegetable that they raise. We ought to double the milk of Canadian cows, in the next five years, and if the dairy farmers would take hold of it there is no reason at all why that should not be done. We are not doing what we should by any means. You have all heard of the beautiful island of Jersey. There are only 28,000 acres in all, rocks included. The portion that can be cultivated and devoted to green crops and grain and permanent pasture is 11,000 acres and they keep 12,000 head of cattle. What do we do here? We have thirteen acres to one cow. In talking about the profit we make from cows, we should take into account rent and taxes and help. There is the interest on the cow. If you have money invested in a cow that money is worth something. There are lots of good dairymen who get 34 per cent. interest on their money by investing it in a good cow; Cobalt will not give you that. There is the decline in the value of the cow or depreciation in bringing of the price for the purchase of her successor. Consider that she is worth $60 when she starts in, and that she will sell for about $12 when she is discarded in six years. Then you must provide for her house, interest, and the cost for caring for the cow. We will credit her with the value of the manure, and take no account of the value of the calf, saying it will go towards the cow's share of maintaining a good sire. We will put interest and taxes at $3.50, decline value $8, interest and taxes all told three dollars and fifty cents, cost of care $12, total $27.00 less value of manure $6.00 that will bring it down to $21.00. We will consider the net profit from two cows in the same herd. These are the exact figures from a herd we have on our records. The first cow gave 8,300 lbs. of milk, or 350 pounds of butter fat, making a total value of $99.55; and the average cow, and what is considered a good cow, gives a total return of only $56.85. It cost thirty dollars to feed that cow last year, which leaves $69.55 in the one case and $26.85 in the other case, and if you bear in mind the other expenses $21 for the up-keep, we bring the profit of the good cow down to $48.50 and for the average cow down to $5.85. That is to say, that the good cow gives eight and three-tenths as much profit as the poor one, and if a man is aiming to get a thousand dollars of profit from such stock he would have to keep only twenty cows of the good kind, and he would have to keep 171 of the poor cows to get that same amount of profit. I do not think I can put more plainly to you the object lesson of the comparison between these two cows. It simply means that if a cow renders $50 profit upon the cost of feeding, you would need twenty to make $1,000, and if she only gave $5 profit you would need two hundred.

I want to say that it is absolutely necessary to know by some system of records, just what each cow is doing. It is absolutely impossible for Government officials to reach every farmer in Canada. I want every farmer to take up this matter of cow testing until we can get such results as I have outlined. (Applause.)

The Chairman: I am sure the address of Mr. Whitley's has been a very profitable one, and one that the dairymen here present can quite understand. I hope it will prove of great benefit to them in the future.

Hon. Sydney Fisher, Minister of Agriculture, Ottawa: In response to your Chairman's invitation to say a few words this afternoon I feed rather like an interloper. My name is not on the programme until this evening's meeting, and I came in this afternoon to listen to what was going on and try to get in touch with the progress of this great dairy convention. I cannot resist the invitation to say a few words to such an audience as this. This is my first visit to this part of the great Province of Ontario. I have heard for many years of the beauty and fertility and richness of the county of Prince Edward, and of the prosperity of the town of Picton, and I was glad of the opportunity of coming from Ottawa to pay this visit and to see what I can of the people of the place. Coming down from Trenton I was delighted by the many beautiful and prosperous homesteads and splendid barns and the number of good horses and cattle in the barn-yards. You are also evidently an orchard county. I understand you have here a large number of the best equipped and best operated fruit and canning factories in the Province of Ontario. We have a new law with regard to that which it is the duty of my Department to administer. I feel therefore in close touch with this country and with this meeting. I was very glad his afternoon to have the opportunity to see you as you listened to the address of Mr. Whitley on this subject of cow testing. It is one in which I take a deep and personal interest, because I think perhaps I may claim I originated the work in Canada and I look upon it as a most important work. We have for many years in Canada been in the fore-front in the manufacturing side of the dairy business through our instructors, and through our dairy schools we have reached a high pitch of perfection. Unfortunately when we come to study the statistics, as I have had to do for many years, we have found that a large number of cows that are milking in Canada the year around are giving a very small average production of milk. If we look at the other great dairy countries which are our rivals in the market of Great Britain, we find Denmark and Holland are away ahead of us in the amount of milk produced per cow in these countries. I do not think, however, that in any of these countries, and I have travelled in both of them, the natural conditions for dairying are as good as they are here. In these countries they have cows which have been bred and selected for milk production. We have here just as good stock, just as good breed for the selection of our production, but in the average production we are away behind. Some years ago Gov. Hoard, of the State of Wisconsin, started in to try and test the cows belonging to the patrons of his factories, and he found such great varieties and such great losses on the part of many people that he was induced to publish the results in *Hoard's Dairyman*. I read these reports, and I was so struck with it, that I felt here was an opportunity and a means by which we might improve dairying in Canada. To-day our lack is more milk. For several years back we have been exporting to Great Britain. We have been increasing these exports, but not as we should. How can we increase our productions? We can do it best by increasing not so much the number of cows as the amount that each cow will give. If all our cows were as good as the best cow Mr. Whitley spoke of this afternoon we would have millions more in the pockets of the dairy farmers of Canada, and there is no reason whatever why all our cows should not be as good as that best cow. It takes very little more work to look after a cow which gives $99 of production than for a cow which gives $50. I am sure after such tables and such facts as Mr. Whitley has been able to give, you will take hold of this subject and begin to test your cows. We have been forming Associations through the country for this purpose. I think Mr. Whitley mentioned fifty-two Associations which were in operation this last year. I am very much encouraged by the progress of this work. We have been doing it now two years. In order to support the work this coming season I feel that the farmers themselves must pay a portion of the cost. We have been paying all the costs up to the present time, and it has now got to the point where it would not be right that the Government should pay all the cost. The farmers should pay some slight share of the cost but not the whole of it; and I therefore had Mr. Ruddick communicate with the members of this Association, and I am glad to say we have had a very thorough and a very generous response to the requests that they should contribute twenty-cents per cow, or in no case less than one dollar for five cows. This will not cover the cost of the test, but will help in the right direction. It is right that the public chest should be called upon to experiment for the public benefit, but when it comes to the business of the people themselves it should be paid for by the people themselves in farming as in any other operations. We have one of the best readymade organizations for carrying on this work in the factory Associations in the country. There are no men more interested in the advance of milk productions than are the makers at our factories and we will pay the factorymen who will make this test five cents a test. It sounds a small sum, but when it is continued through the season and a large number of tests it will amount to a reasonable sum. I am satisfied with the results as shown in the reports of what has been done during the last two years. I want to congratulate you on the most auspicious opening of your convention. I understand it is a good while since you were in Picton, and I am sure that this success is evidence that the choice of the locality this year was a good one and that the farmers and dairymen of this district have responded in a way that must make glad the hearts of the officials of your organization. (Applause.)

C. C. JAMES, Deputy Minister of Agriculture for Ontario, being called upon for a few remarks, said: In this very close atmosphere it would be presumptuous on my part to inflict a speech of any length, especially in view of the very important subject yet to be presented to this meeting. I will, however, offer my congratulations to the Association on having the President in the chair to-day. Our Department always felt that the Eastern

Ontario Association would be well conducted as long as Mr. Derbyshire occupied the position of President, and when he stepped out we were exceedingly gratified to have his place taken by Mr. Dargavel. (Applause.) It is the first opportunity I have had of appearing before this convention since Mr. Dargavel took that position. I have been watching the Picton papers for some time. This meeting is not a matter of momentary impulse; we have heard of it for more than a year. In fact I think it is three or four years since certain persons began to advance Picton as a place for holding a convention. All things come to those who wait, and at last the convention has come to Picton. My curiosity has been much aroused and I have been watching to see whether it was going to be a successful meeting, and I am glad to see that it has met with abundant success. (Applause.)

CHEAP PRODUCTION OF MILK.

By Henry Glendinning, Manilia.

The subject that I am to discuss is that of "Cheap Production of Milk," but Mr. Whitley, who has just preceded me, has given you a good deal of my address. A cow in the hands of the farmer is a machine to produce milk. In any of your factories you will find they put in the very latest machine, provided it will produce the article just at a trifle less cost than the old one. The farmers of the Province of Ontario are not discarding the old machines fast enough. I believe that the dry season that we have just gone through is perhaps not an unmixed evil. I believe that owing to the shortage of food a good many of the old machines that have been doing business on the farms of Eastern Ontario have gone to the canning factories, and in that way it will be a benefit. I consider many of these old cows as simply scrap. Mr. Whitley has shown you what to go by: selection, and the weighing of the milk. I think that is the very best advice that could have been given you, and I am pleased to hear from the Minister that that line of work is to be continued.

I do not intend to say very much about the cow this afternoon. You have been through a very dry season, the cows have been short of grass, and in many barns at the present time there is not sufficient food for the wintering of cows in the way in which you would like to do it. We cannot mend matters at the present time, but I think we can do something for the future. We must lay our plans so that we will be a little better off next year than we were the past year. You will find that the cow gives you the best results when she is turned upon the fresh grass in the month of June. There is no time when she seems to make milk so easy as at that particular time. Why is it that you get such good results? The cows are turned out in the fields, and they have all the conditions there necessary; they have plenty of pure air, plenty of sunshine, pure water and an abundance of very sweet, nourishing, and palatable grass. They are not troubled with flies, and the cow has nothing to do but to produce milk. These are ideal conditions for the production of milk, but unfortunately we cannot carry these through the whole season of the year, and we must try to help out matters by getting as near the summer conditions as we possibly can. People in the eastern part of the Province of Ontario do not do much in the way of winter dairying. They milk their cows six or seven months and let them go dry for the balance of the season. There were two arguments put up against that: first, the labor question and the next is the feed. I do not believe the labor question is as serious as you imagine. Where you hire your men by the year you are able to hire at a less wage proportionately than you can for a few months in the summer. Most men want to hire their labor for eight or nine months, and consequently their wages are away up. That man has to board with some person during the winter, and he eats up a great deal of his summer's wages in that way. In a case of a man hiring by the year, he gets them at a reasonable figure for the twelve months; the man has a home for the whole year, and at the end of the year he is a great deal better off than if hired only for eight or nine months. In our section a great many work only in the summer months, start over in the spring just where they had been the year before, but the man who works for the twelve months always has an increase in his bank account.

We have not very much chance to raise the price of our goods at the other end, but we have an opportunity of producing cheaper milk than we have been getting in the past. I believe it is possible to produce milk cheaper in the winter time than it is in the summer. I know when I make that statement there are a great many people who will question it, and I want to be clear on that point. We have to introduce something into our feed so that it will be as near summer condition as possible. We must have abundance of feed, it must be palatable, it must be succulent, and it must be of the right character and take the place of grass for the production of milk. What can we do that with? By feeding corn silage or roots. Corn silage contains, practically, twenty-one pounds of dry matter in the one hundred pounds; the balance consists of water. Grass runs along just about in the same percentage of dry matter that corn silage does. June grass represents thirty-five pounds; that is, when it is at the state for cutting at the blooming stage. Sometimes it runs down as low as fifteen or even less. Corn silage will give you succulency in food; it will also give bulk, and it is palatable. You will notice that any food which is a good milk producer contains a high percentage of protein. June grass in the green state contains about 3 per cent., red clover hay contains a little over 6⅘ per cent., white clover hay contains about 11½ per cent., and wheat bran contains a little over 12 per cent. If we want to get a good milk producer, we can always pick upon it by looking at the column known as protein, and when we see a high percentage of that we know that we have the right thing to produce milk. Corn silage is lowest of the feeds so far as protein is concerned, being only .9. Now you say, why do you talk about corn silage being so good? It is good because it is palatable, succulent, and is produced cheaply, but if you want to get milk out of it you will have to feed something else. I believe the silo is not as generally used as it should be, owing to the fact that some man has built a silo, and he fed that and practically nothing else, and not getting very good results from it he became sick of it and talked against the silo. The farmer should feed wheat bran in connection with the silage, and he will get excellent results. Bran has now got out of sight. I do not know what you are paying for it here.

A Member: Twenty-six and twenty-eight dollars a ton.

Mr. Glendinning: I do not think that any of you can afford to pay that for it. You cannot pay that price, and convert it into milk at a profit. It may pay indirectly in the way of keeping up your cows, but it does not leave you very much profit. We have to get the protein in some way. One hundred pounds of milk contains a little less than thirteen pounds of solid matter, but out of that thirteen pounds there are three pounds and six-tenths of protein, so that you see there is a very large percentage of protein in milk and you must put protein into the cow. You could not get milk or protein in milk from putting corn silage alone into the cow any more than you could get wheat flour at a mill by putting saw-dust into it. Alfalfa hay contains nearly as much protein as bran per ton. One hundred pounds of alfalfa hay contains eleven pounds of protein, while one hundred pounds of bran contains only a trifle over twelve pounds, so that you see that they are pretty close.

Q.—Do you mean alfalfa green or cured?

A.—That is cured, showing twenty-one pounds of dry matter to the one hundred pounds. Of course in the case of green hay you would not have so high percentage, because you would have more water. Now, what does it cost to produce alfalfa? You have told us here this afternoon that the bran costs you as high as twenty-eight dollars a ton. I will give you the cost of producing alfalfa hay on my own farm. I do not live very far from you, and I hope to be able to show you next summer if you come out to visit me. I can put alfalfa hay into the barn at two dollars per ton.

Q.—You haven't any to sell? (Laughter.)

A.—No, sir; I have not. I never sold but half a ton of hay in my life, and I waited four years for the payment for that hay. (Laughter.) I can put it in the barn at two dollars per ton and pay a rental of four dollars per acre for it, and that is as much as an ordinary farm is worth. An average crop of alfalfa in three cuts per year will run from five to six tons per acre.

Q.—Dry hay?

A.—Yes.

Q.—The majority of the land around this country is not suitable for growing alfalfa? It is too wet.

Mr. Glendinning: I know there is a lot of land in this country that will not be suitable, but you know this is an Eastern Ontario convention, and I am talking to the people of Eastern Ontario. Where water does not not stand on the land it is all right, and there are a lot of people who say they have tried it. In one instance I had one good crop, and it disappeared from my land afterwards, and it will not succeed in that field, but that didn't deter me one bit. If I had given up growing alfalfa some seven or eight years ago, I would have spoken against it. I have been at it ten or eleven years, and I have not said anything about growing alfalfa until last year. I wanted to make sure of my ground, and I now feel that I can grow alfalfa with greater certainty that I can grow red clover. I know you can grow red clover in this county, and if you can grow red clover you can grow alfalfa just as well as I can.

Q.—Tell us how right now?

A.—In the first place I say do not sow it on low, wet, mucky ground. get it on high dry land, and where there is sufficient roll to carry the water off so that it will not form ice. If the land is covered with ice the plants will be killed. The soil for growing alfalfa should be good clay loam with plenty of limestone. I have never had any experience with a sandy loam, but I have seen good crops on what I consider light land, and I think it would be well worth trying on sandy loam. The land should be perfectly clean and it should be rich. When I pay four dollars an acre rent for land I want pretty good land. Use land that has had a hoe crop the year previous, and where it has been manured; and where you are in the canning business you will have lots of that kind of soil. I would not plow that land in the fall of the year or in the spring. That is one of the things I would not like a man to do on my place. I would take and cultivate that land up in the spring of the year and get a very fine tilth on the surface. I would grow a nurse crop, and I find that the best nurse crop is barley—three pecks of barley to the acre. We treat the seed with nitro-culture. We sow the seed in front of the drill.

Q.—How many pounds of seed?

A.—From fifteen to twenty. When I buy seed I sow twenty, and when I grow the seed myself I sow fifteen. I found I had a better catch with fifteen pounds of home-grown seed than I had with twenty pounds when I bought it. I cannot tell you just why, but that is generally the result. Sow it in front of the drill. Somebody will say you will cover it up too deep. No; you will cover it shallower by sowing in front of the drill than you will behind. When the seed falls in front of the drill, the hoe comes along and throws the seed out in between the two rows of grain. If you sow it behind, the seed falls off over the ground, and naturally goes to the lowest level, and you will find the greatest percentage of seed along with your barley. We give it a cross stroke with the harrow, and a little gets in with the barley, and we have the majority of the seed in between the rows. We roll our land immediately after harrowing, and we hitch the weeder on behind the roller. As the roller presses down any small lumps the weeder comes right along, and rakes up and makes a very fine mulch of the field. In that way we get our best catch and our fields do not suffer with the drouth the same as if we left them finished with the roller. The weeder is not sufficient to rake off any big stones on top of the ground. When your plant commences to grow it comes up between the two rows of grain, and they are not crowded out by the barley plants. The roots of the barley being stronger, reach out and take up the nourishment and the moisture, and if you happen to have the bulk of your alfalfa in the same row these are sure to perish. There is nothing more to do to that field during the year following except, of course, you cut the barley off. This nitro-culture has been known for only a few years. A year ago last spring I put in an eight acre field on the farm that I had bought across the road from my own, and as there had never been any alfalfa grown on that farm, I thought I would try it as an experiment. I sent to the Agricultural College at Guelph and obtained the culture. It comes in a bottle, enough in each bottle for a bushel of seed. It consists simply of some gelatine in a little ounce bottle, and the directions come with it telling you how to use it. I also sowed a portion of the field with seed that had not been treated, and that portion of the field was very sickly looking stuff. The line between the two was as marked as if it had been plowed, and the portion that had not been treated reminded me of the first alfalfa I had grown on the home farm. They were small sickly plants. We did not cut three crops last year owning to the dry season. I believe what has caused failure in alfalfa more than anything else is the pasturing of it. It will not stand pasturing, it will not stand tramping, and it will not stand close cropping. I have a field that has been cut for five years. The gate-way is right in the centre of the field, and where we drive in to cut the crop the plants have become thin and short, and you can understand that if it won't stand tramping in the most favorable weather, at the time of making hay, what would it be in the fall of the year when it was wet. My advice to any person who wishes to break up a field of alfalfa would be to turn in your stock in the fall of the year and pasture them there. Every time a colt takes a bite out of the centre of a plant it becomes a dead plant, and if you allow them on it during the winter it will be like an ash bed and you will have no trouble plowing up the alfalfa field if you follow that plan. (Applause.)

Q.—Is there any nitrogen that goes into the ground when you plow it up?

A.—Just the same; it is left in the ground.

Q.—How do you cure the first cutting?

A.—It is a little hard to cure. Our plan has been to cut in the forenoon, and ted it once in the forenoon and again in the afternoon; then, about four o'clock, rake it up and put it into small coils and let it stand there three or four days. If the weather is good at the end of three or four days you can spread these coils out and draw it in to the barn. Perhaps showers come along, and in that case it will take longer. There is one thing you want to be careful about: If you allow these coils to stand in the field too long they have a tendency to destroy the plants under the coils. It is a good thing to have a couple of men go along with forks and draw the coils on to another place. When we come to the second and third cutting it is very easily cured. We cut in the forenoon, ted it twice, rake it up towards evening, and let it lie in the winrow over night. Next morning we put a span of horses on the tedder and ted right up the windrow, and then put the hay loader on in the afternoon and take it right into the barn. Our best hay is secured from the second and third cuttings.

Q.—Why is it they do not advocate growing alfalfa hay?

A.—Because they cut the hay down and let it dry up and when you put the tedder on the leaves fall off.

Q.—Would there be anything in the state of maturity at which it was cut?

A.—Yes, if they allow it to get too ripe. We cut it just when it is coming into bloom, when one-tenth of the blossoms are on. If you allow it to go too far it will become weedy.

Q.—There are different kinds of alfalfa?

A.—There are different kinds, but I don't think there is much difference so far as the quality of the hay is concerned. I think, as far as we have gone in Ontario, we have practically had one kind.

Q.—What rotation do you have?

A.—You could not rotate with alfalfa. You must cut your rotation out because it is too valuable to plow up. A man who has a good field of alfalfa would make a great mistake to plow it under.

Q.—What experience have you had in raising seed, and which crop do you take it from?

A.—I only grew seed one year. We used the second cutting for seed. I might say that from a commercial standpoint I do not know that the average farmer will make a great success of growing alfalfa seed.

Q.—Where would you recommend a man to send to get good alfalfa seed?

A.—We have to depend upon our merchants in the country. I found that when I wanted to buy alfalfa in Toronto I had generally to make a trip around to all the stores before I could get something that suited me. Much of the alfalfa seed contains rib grass.

Q.—What is rib grass?

A.—Another name for it is Buckthorn and the English Plantain. In England they sow it for sheep pasture. A great many fields of red clover have it; some call it wild timothy.

Q.—We have lots of it here, and they do not know it?

A.—It has long narrow leaves, a little short head, and the blossoms are quite conspicuous. It resembles timothy except that the leaves are long like a leek leaf. It has a brown seed that looks like a little canoe.

Q.—When you cut that crop of seeds did it injure the plants?

A.—The next year we had the biggest crop we ever produced, and the next year the fields were bare all winter, and I was afraid my alfalfa would disappear in the spring, but it came out favorably.

Q.—How many years was that after the first seeding?

A.—That was the third year. The second or third year is about its best.

Q.—Do you manure your meadows?

A.—We do some, not always. We give our alfalfa a coating of about three loads of manure to the acre every third year.

Q.—How about seeding wher you have alfalfa five or six years and break it up?

A.—In that case I would not bother with nitro-culture, because you get the same effect by taking some of the soil from an old alfalfa field and scattering it over the field.

Q.—Is there any danger of the sub-soil being too hard if it is not plowed in the fall or spring?

A.—No, we want a subsoil firm, and when you get alfalfa on it will give it a soil better than you have had before.

Q.—How deep a seed bed do you give?

A.—Two or three inches, but make it fine.

Q.—How do pigs do on it?

A.—They do well.

Q.—How would oats do instead of bran?

A.—They cost too much, and they have not got as much protein in as bran. For summer soiling there is nothing that I know of as good as a field of alfalfa.

Q.—How will alfalfa stand the drouth?

A.—Better than any of the well-known clovers, because it is deeper rooted. Of course it suffered this year with the dry weather as well as the other clovers. The second cutting was short.

Q.—How much cheaper can you feed alfalfa than bran?

A.—I think twenty pounds of alfalfa hay would be good for a cow with silage. Now twenty pounds of clover hay would have nearly the same amount of protein as twenty pounds of bran would have. Twenty pounds of clover hay would cost you two cents. Eighteen and a half pounds of bran would cost you nineteen cents.

Q.—Will a cow get as much out of it?

A.—I will tell you something I learned on New Year's day. The man who has charge of my stable is a sort of autocrat. He said to me, "There is a cow and she freshened on the last week of June, and she is giving practically as much milk now as she was any time in the summer." He milked the cow, and I got the scales and weighed it, and I went back at night and weighed it. I found that the most that cow ever gave was twenty-eight pounds in the summer, and that is not a very big yield. She was a Jersey cow. On New Year's day she gave twenty-five pounds, and what did she get? Corn silage, and some oat straw, cut with corn silage, because we are trying to spread it out this year, and fifteen pounds of roots, and she had alfalfa hay. She had not one morsel of grain or bran of any kind, except the grain that grew in the corn. Now, I leave that to yourselves. The cow gives twenty-eight pounds in July, and on New Year's day six months afterwards gave twenty-five.

Q.—I suppose that cow is worth $200.

A.—She is worth $200.

Q.—What is the average test of that cow?

A.—Her average test for July was 4.4, her test for December was 5.2. She is making more than she was in July. She would give me 8.62 lbs. a week, or nearly 8¾ lbs. of butter fat; and allowing 15 per cent. for over-run, she would make close on to ten pounds of butter. Taking her twenty-five pounds of milk on New Year's day, at a percentage of 5.2 butter fat, she was giving 9.1 of butter fat, or equal to 10.47 of butter, more on New Year's day than she did in the month of July. Of course the conditions are somewhat better. There are no flies to bother the cow in the stable, she is getting all that she will eat of alfalfa hay and corn silage with a few roots.

Q.—Do you know what it costs to produce a pound of butter?

A.—I have not figured it out, but it would be an easy thing to do, supposing we feed her 40 pounds of silage that costs $2 per ton. Take that for thirty days it would be $1.20, fifteen pounds of mangels at six cents a bushel would cost us 45 cents for a month, twenty pounds of alfalfa at $2 per ton would cost sixty cents a month. The total cost of the month's feed for that cow would be $2.25. 271 pounds of butter in the six months at twenty-five cents a pound would be $67.75, that would give me $54.25 profit for six months.

Q.—Do you think you can cut alfalfa hay, and put it in the barn for $2 per ton?

A.—Yes, I can put it in for less. I took an eight acre field that I had in alfalfa hay, and I will consider an average crop will be five tons to the acre. I charge $4 an acre for rent, that would be $32, and ten hours cutting $3. I am considering a man hired by the year with a team of horses, and I do not think it costs me $3 a day. I put nine hours tedding twice, at $2.25, using one horse 4½ hours; raking at $1.15; cocking and turning out cocks, $5; two teams and four men, for hauling $8; one man in the mow $1.50, and one horse and boy $1. That is $53.90 putting in the first crop. Then I allow three tons of hay to the acre for the second cutting, and as there is then no rent to pay, that costs $11.15. I am only asking 1½ tons to the acre for second cutting. The third cutting costs $10.50, and I am only asking ¾ ton to the acre. In these three years' cuttings I will have 43 tons to the eight acres, and will cost me $75.35.

Q.—Did you ever try to seed it down with timothy?

A.—No; by all means keep timothy and other grass away from it. Some people sow red clover with it, but it is not much better.

MORE ADDRESSES OF WELCOME.

At the evening session of Wednesday the First Methodist Church was packed by farmers and townspeople. A splendid musical programme, interspersed the speeches. The Mayor of the town presided.

Rev. Vernon H. Emory, pastor of the church gave a brief but hearty address of welcome. He said:—I am the son of a farmer. There are a few things in my life that I am proud of, and that is one of them. We sent you, as members of the Asociation, a unanimous invitation to hold the evening sessions in our church building. Personally, I believe that the church is broad enough to open its doors to every legitimate thing in which its members are interested so personally. I have no fear whatever, in placing the auditorium at your disposal. I may say we are proud of our church, and we are proud of you, and we hope that your stay in our town will be a very pleasant one, and abundantly promote the interests which your Association have at heart. (Applause.)

Dr. Morley Currie, M.P.P.: To extend a welcome to friends would be easy; it would be easy to extend a welcome to relatives; it might not prove to be so easy for us to extend a welcome to these great leaders of the country. I must say, I feel is is difficult to extend an adequate welcome to this great agricultural and industrial association—the greatest industrial association of this country, and I say so advisedly. I do not mean the magnitude of its productions alone; I mean also, the greatness and depth of its conception. When we look back to the nineties, we find a small band of men in Germany, who said we will apply every principle of art and science to the industries of Germany, and we believe we will get results. The result was, that the commerce and manufacturing of Germany was multiplied, as you all know, twenty fold. This Association has reason to be proud of the fact that we have amongst the farming community of the country, men who had a broad conception, and who applied the principles of art and science to the dairying business. They had the courage of their convictions, and they went on and put their ideas in force. Not only have they made a great industry, but they had made contributions to it. The expert work of the chemists, the observation of bacteriologists, the work of the mechanical engineers, and those who are best versed in our best structures, were brought to their assistance. And the wonder is, although these pioneers in the cheese industry had this foresight, the manufacturers of this country are just beginning to get on a level with them. Other manufacturing industries are twenty times behind the times. You can go to the canner, and you can say, if you know at all, tell me what is the effect of passing an uninterrupted current through a can of corn, will that destroy the bacteria, just as heat will? And he will not know. Ask him if he has got a satisfactory corn-husker? No, he has nothing satisfactory. Ask him if he knows what a strong current of air will do to carry off the corn husks? And he will say, "We have never tried it." I believe, in this case, as in many others, there will be found that the main stone in the building of our national edifice has come from the rough quarry of the common people of the country, and for these reasons I have no adequate ability to express a welcome to such a great Association. When you have crossed the Harlem river into New York to the Island of Manhattan, it may have occurred to you, as it occurred to me, there are so many contrasts between going to the Island of Manhattan and coming across to Prince Edward county. As you cross to this Island you are surrounded by the blue depths of the clear water in contrast to the greasy water that surrounds Manhattan, and when you come in here you have the fields and flower-beds where you have something pleasant to the eye. Coming into New York you have ill-ventilated streets and sky-scraper buildings. In comparing the two places you find one similarity and that is, we have erected a sky-scraper in the country of Prince Edward greater than any in New York. It is bounded only by the confines of the whole county and I hope none of you while you are here will discover the vertical dimensions. That sky-scraper we have erected to-day is the hearty welcome of the people of Prince Edward County to the Eastern Dairymen's Association.

Senator D. Derbyshire: I am sure we must all be delighted with the very warm welcome we received in this important city, because it must be a city and the county itself must be made all of towns, from the description we have heard from our good brother Dr. Currie. (Laughter.) I am sure we must be very much pleased not only with this reception to-night but with the reception we had in the practical part of our work to-day in the other hall. We have been particularly delighted with the way we have been received and the kind attention we have been given by your good Mayor. It is only a few years ago since we had any influence with the Government. It is only a few years ago that we did not have any money voted by either Government in connection with the dairy work in this great Province of Ontario. It is only a few years ago since a few struggling men took hold of this business and went heart in hand. We were bound to make it go, and we made the Ontario Government give us grants and we made the Dominion Government walk right to the front and give us shipping facilities, which they seemed very glad to do, and I am delighted that at present time, without going through the history of all these years, we are now getting grants and we are making the best article of cheese that is made the world over. Now we are delighted with the way we have been able to do all this work. It is only a few years ago since we went to Chicago and took 95 per cent. of the prizes; the people laughed when they thought about Canadian cheese going over into that great country, the United States. They did not realize what we were doing over here, but we took 95 per cent. of the prizes for fancy cheese at that great exhibition against the competition of the world. That was the work of Canadians. (Applause). And we brought fame to the name of Canada, and made every other industry of the land known throughout the world on account of the products we were turning out. What we want now is, to keep still better makers and pay these men so that they can afford to stay in the business. We have with us to-night the Hon. Sidney Fisher, Minister of Agriculture for the Dominion, who gave us refrigerator cars to carry our goods to Montreal and refrigerator apartments on the ships to carry goods to the old country, and then refrigerators at the other end to hold the goods so they would not spoil before delivering to the customers. We feel proud of the work we have done, and we feel proud of the money, $101,000,000 we received for butter and cheese and bacon in 1906. This means more money than we ever got in the history of the country, and every industry was flourishing last year on account of this additional money. Our business in Picton to-day and for the next two days is to educate the men so that they will produce better quality of milk and larger quantities, and get it to the factory in better condition, and this year make $10,000,000 more than we ever did before, and we can do it if we only try. We want $10,000,000 more money in 1908 than we made in 1907, and that would mean that every spindle in every factory, every store-keeper, and every man in the Dominion would be benefited and every industry would be floated at high tide, and this grand Dominion would take another step in advance on account of the educated dairymen. Don't make any mistake: Every industry rests upon your intelligence, and we ask you to co-operate with us and assist us this next year in making this business a grand success, and we will have a proud record in the way of progress. I am delighted with your reception, and thank you very much on behalf of our Association.

SOME AGRICULTURAL DISCOVERIES.

By C. C. James, Deputy Minister of Agriculture, Toronto.

As Mr. James arose to address the meeting he was presented with a beautiful bouquet of carnations by Miss Tottie Hepburn, whom he gallantly kissed. He then said: Occasionally I am apt to feel embarrassed, and if it were not for the fact that I have at the back of me my good friend, the Senator, I do not know how I would be able to conduct myself on an occasion of this kind. This, I think, is the first occasion upon which the Association has been housed as it is to-night. We have met many gatherings in connection with this Eastern Dairymen's Association. I do not think we have ever had a larger, more representative, and shall I say more respectable looking audience than we have here to-night. (Applause.) Someone might question, perhaps, the propriety of holding a session of the Eastern Dairymen's Association in a church. Well, if it is not fit to come into a church it is not fit to continue its existence anywhere. I can simply say that, from all I have seen and known of the Association, you need have no fears at all about admitting them into your place of worship. Senator Derbyshire's remarks as to the importance of agriculture and dairying called to mind a little incident which I noticed a few weeks ago, just at the time of the financial crisis in New York. I took a train at Niagara Falls and at once found myself in the company of four men who were strangers to me; but apparently, from their talk, they were business men coming to Toronto from the United States. They appeared to be men of means. The conversation very soon drifted into the peculiar financial conditions, and one man said: "Well, somehow or other, I am not very much concerned about this. You know, I never get really afraid of a financial crisis until I hear there has been a failure of crops." That, I think, preaches its own sermon.

Thirty odd years or more ago I was quite a small boy, and I remember starting out from home with my mother at what at that time I looked forward to as a very, very extensive trip. We left Napanee, county of Lennox and Addington, and soon after crossed into Prince Edward county, and although I was very young at the time I have a very distinct recollection of going first to one farmer's house and stopping there for awhile, and then going on to another, and then being taken to another, and so on. And I enjoyed myself thoroughly, as only a boy can. The farm houses were comfortable, well situated, had good orchards and all these attractions which appeal so much to children. Finally we came in over the road to the town of Picton. Years afterwards I asked questions, and I found out as we went along from place to place we were simply going from one relative's place to another, and I have come to the conclusion since that I must have been able to claim relationship to perhaps, a majority of the people of the county of Prince Edward. When I learned that the Eastern Dairymen's Association had decided to come and hold their annual meeting here, in the old town of Picton, I felt sure they would be amply repaid. Thirty or thirty-five years is a long time; yet, after all, in the history of the people it is a very short time. And those of you who go back and compare the farms of to-day with the farms of that day must see what a wonderful change has taken place. Agricultural conditions have been much changed in this country, and nowhere, perhaps, to a greater extent than right here in the township surrounding the old Bay of Quinte. The kind of farming carried on at that time is no longer practised. Methods that were then in vogue have been discarded, and new methods adopted. Changes that have come over agriculture are not confined to your county or your experience, but, wonderful changes have been going on all over the country.

A few years ago the discovery was made that agriculture was, like every other kind of industry, controlled by forces directed according to certain fixed laws; and that, after all, there was for this agricultural work a scientific basis. It seems rather remarkable that this industry, which necessarily has been part of man's work ever since man was upon the earth—because ever since man has been here he has had to produce his food by toil, and agriculture has played the principal part in the production of his food—it seems strange that until recently it was not found out that his work is controlled and directed by fixed laws and regulations the same as any other industry. Formerly there were only one or two books on some phase of agricultural work. You will now find them scattered broadcast all over the country. Where formerly there was no school teaching agriculture, we have now in every state of the Union and every Province of the Dominion, agricultural colleges—institutions devoted to the teaching of the science underlying agriculture. That was the first step towards an awakening of modern agriculture—when it was recognized that agriculture was not a matter of mere chance, that it was not a business controlled entirely by the weather or by that mysterious Providence behind which so many people hide themselves; but that agriculture was, after all, controlled by scientific principles, and that the men who knew most about it must get down to the study of these principles.

After this first step had been taken, after agricultural colleges had been built and facilities had been provided for giving instructions, associations like the Eastern and Western Dairymen's Association and the Fruit Growers' Association were organized. And they stood back and said: "We have the knowledge; come to us and we will instruct you. We will tell you all that we know." The next discovery made was that that would not do at all; that the people would not come. And the whole thing had to be revised; and they had to go out from the college and the association, teachers and instructors, and seek the people. It was the case over again of Mahomet and the mountain. In order to succeed, the information had to be taken to the farmers.

The next discovery that was made was that in going out to seek farmers, dairymen, poultry men and fruit growers, through the Farmers' Institute, they were going to the men of mature years, the older men. On looking over the magnificient audience that we had in the Parish Hall this afternoon and in listening to the addresses, I could not help remarking that the majority of the men in that audience were men of mature years; they were in fact, men of more than mature years. I almost suspect there were a great many men in that audience who were beyond the years of applying the information that had been given them.

Having found out that we must take the information to the people, we have next come to this discovery that we have been taking the information to the men of mature years we began to revise the order of things. We erected in the towns throughout the Province, schools; but we did not grade these schools from the old people down, but, from the youngest up. Now we have found that the work that has been carried on in this country and other countries, through the Farmers' Institutes and through our other organizations, has been directed largely towards the older elements in the community. We have been working over the heads of the younger people. We have brought little or nothing to the young men, and very little to the middle-aged men. That is a discovery we are just making in these late years. We have got to find the solution to that question. Whether it deals with dairying, live stock or poultry, we must take it to the young men and the boys; and we must not allow them to pass the receptive age before we lay before them this great and important work.

There is another discovery that has come still later, and it perhaps surprises us to learn that these discoveries are so patent. The last discovery we have made is this: That the farmer, after all, is himself of the least importance; that that farmer has a wife and has a daughter. Through all these years we have overlooked that fact, and have neglected them. We have built our Agricultural Colleges for the young men. We have formed Dairymen's Associations for the men, mere men. We have our Fruit Growers' Association—men again. We have our Agricultural Societies, controlled and largely built up by men. And through the whole agricultural organizations of the country, women to a large extent have been left out, have been neglected, and we have been working for the farmer just as if he was an old bachelor living all alone by himself, making his own clothes, getting his own meals, and living entirely to himself. Don't you see that in doing this work we have overlooked the fact that the whole farm life is kept going not so much by the father, by the son, or brother, but by the women. We have just awakened up, and made this discovery that in every farm house in this country there is a woman at the head of affairs, and in most of them one or two daughters, and we have organized Women's Institutes. You talk about the progress of Farmer's Institutes; it is nothing in comparison with the way in which the Women's Institutes' work is going ahead. Suddenly the women of the farms of this country have found out there is somebody taking an interest in their work, and that they count for something, although they have been carrying the heavy load of the farm work. You know the old saying:

> "Man works from sun to sun;
> Woman's work is never done."

This is particularly true in the farm homes. The farmer's wife and daughter have found out for the first time in their history, that outside of the little church organization, outside of the quilting bee, or paring bee, there is something coming into her little world which promises to improve it, which promises to bring fresh life into her existence and fresh hope, and which promises to raise her up and put her on a equal standing with the men in this community. I do not think you have found out in this section of the country what this new movement means. Where it has been started in the western part of the Province, the women have assisted it eagerly, and they are developing it to the greatest possible extent; and I tell you that the home work of this country is a matter of great consequence to the future of our people. Humanity is more bound up with the conditions of the home life of this country than it is with our schools or our churches. (Applause.) And if we can improve the home life through the Women's Institute we will be starting the leaven right in the centre of the lump. So long as we neglect the home we cannot expect the church, the school, the college, or any of these secondary organizations to work out to their full that which they might accomplish. (Applause.)

BACK TO THE FARM.

By Hon. Sydney Fisher, Minister of Agriculture, Ottawa.

Hon. Mr. Fisher was also presented with a magnificent bouquet of roses by little Miss Ina Hepburn, whom he took in his arms and kissed. He said: This is indeed a welcome to the town of Picton, and to the county of Prince Edward, which warms the heart and makes one feel at home. This is the first time I have had an opportunity of coming amongst you; and I am glad indeed to have it even at this winter time. I think everybody I have met to-day has said to me: "You should come in the summer to see the beauties of our country and our town." I would be glad indeed to come in the summer, when I am sure this rich and fertile country and this prosperous town would look very beautiful; but, I do not want to wait until next summer to come amongst you, and I preferred to come this winter. Judging from what I see in the winter time, I think if I were to come in the summer I would not be able to tear myself away; I would have to resign the work in which I am called upon to do in other parts of this agricultural country and settle down here in this, one of the gardens of the land. Let me here congratulate not only Mr. Derbyshire but the country and the Senate on the fact that the old-time President of the Eastern Dairymen's Association of Ontario has been translated to the Upper House. (Applause.) It falls to my lot to put agricultural legislation through the House of Commons, and I have often felt that I would like to have somebody thoroughly versed in agricultural matters with that winning way and with that appealing power that your former President has to help that legislation through the Senate. Now, Senator Derbyshire, I am going to throw on your shoulders the work of helping me to carry through the upper chambers of Parliament whatever is necessary for the farmers of this country. (Applause.) The Senator has told you of the excellent work of the Dairy Associations in this Province. I do not come from the Province of Ontario myself, but, come from another Province which is not so far advanced in agriculture, and I have looked to the Province of Ontario for inspiration and to the farmers of Ontario for information. We are a broadly extended land, from the Atlantic to the Pacific, covering three thousand odd miles of territory; and if in any one part of the country there is some slight falling off in our agricultural success, the greater success in other parts of the land more than makes up for it. There has been continual, steady progress amongst the farmers of Canada for many years back. This year however, has been one, I think, which has been almost universally hard for agriculture. I cannot remember any year in which in every part of Canada, with some slight exception here and there, the farmers have had a harder year. Yet, notwithstanding the almost universal hardship of it, I am glad to say that Canada has come through it well; and her financial condition and her commercial prosperity is sound to-day when our neighbours and other countries are tottering and uncomfortable. (Applause.) This is, no doubt, largely due to the fact that for a number of years back we have had unprecendented agricultural success. Mr. James has told you this evening the way in which our agricultural progress has been maintained. He has told you how our farmers have taken hold of their business and made progress all along the line. I venture to say there is not a part of the Dominion of Canada that has benefited so much by investigation, by experiment, by teaching and example as the farmers. Our industrial situation is not so good. We have technical education in agriculture, but, practically no technical education in any other branch of our social system. We have been told to-day what has been done for the farmers in the way of technical education; and if to-day the farmers are making progress it is due to these things more than anything else. I find a great many people in the cities complained that they have to pay so much for the things that the farmers produce. I am constantly told that butter is an outrageous price, and they have to pay forty and fifty cents a dozen for eggs, and that bread has risen in price, and if they want fowl they have to pay double the price that they paid a few years ago. I am not going to dispute the facts. I hope they are true. I am glad that the prices of our agricultural products are so high. I am glad for the farmers (applause), and I am glad for the whole community. You can quite understand why I should be glad for the farmers, but you cannot understand why I should be glad for the rest of the community. Let me say, that if to-day the farmers are getting the best of it, they have only just come into their rights. For a generation or two we farmers have had a hard road to hoe, and they have had to take the brunt of the financial burden; and it is time that in a turn of the wheel they should be on the uppermost side, and I am glad that they are at the present time a little nearer the top. Why should I be glad for the rest of the community? This is a little more difficult to explain, and I will ask you to bear with me for a few minutes. Why is it, that last season, butter was higher in Montreal, Toronto and Ottawa than it was in Liverpool and London? I think I can give you an explanation.

During the last generation in Canada, as in the United States and some other places of the world, there has been a steady drift of the population from the country to the cities. Our census, and the census of the United States, has shown an abnormal increase in European population, and nothing like a comparative increase in our rural population. Why has this been the case? In the first place, because the city people have greater opportunity for enjoyment, an easier life, and greater reward for their toil; and the result has been, the young farmer boy and girl see their city cousin much better off than themselves. When they come to manhood or womanhood they try to get to the city if they possibly can. Mr. James said a few minutes ago that he found the gathering largely composed of men of middle-age or older. Why is that? Because to a large extent young men have been leaving the farm, and have been going to the cities, and have been taking the girls with them. Why have they gone? I cannot believe that it is because they live in the centre of a city with nothing around them but brick and mortar. I do not think that that is any temptation to a man to leave the beauties of the country life with the green fields and beautiful trees and the sparkling water as it tosses around in the creek. I cannot believe that they prefer the smoke and vitiated atmosphere, and the heat of the great city. But yet, they go there. Why? First, because they think they can make more money there. And apparently they do, and have been doing for years back in Canada and the United States; and the result has been a steady increase in our city population at the expense of our rural population. How does this account for the fact that the price of food has got high? It means that there are more people in the city to consume that food and fewer producing. And although the agricultural machinery and improved methods still enable a fewer number of farmers to produce as much as a larger number used to, still to-day there is a greater number of mouths to fill, of people who do not produce food at all, who are engaged in commercial operations, and on our railroads, and our ships. That does not account altogether for the whole of it, but it accounts for a great deal of it. There is another thing which accounts for a considerable part of it, and it is that our country is becoming more prosperous. Money is more plentiful, and people are living better, and more people are eating the luxuries of life, and eating more of the necessaries of life than they used to twenty-five, thirty, and forty years ago. There is another reason why butter is so high; it is much better than it used to be. I remember the time very well, if I went to a country hotel or to an ordinary restraurant in the city, I had butter put before me which I did not want to eat, and I got through my meal with as little of it as possible. It was then a rare thing in Canada to find real, sweet butter. But during the last ten or twelve years, that has completely changed, and to-day you can go hardly anywhere in Canada and not find good sweet butter that tempts you to eat as much as you possibly can of it. The result is that all of you people of Picton, Belleville, Deseronto, Ottawa, Montreal, and Toronto are eating pounds of butter where a few years ago you ate ounces of it. It is a good thing for the farmers, and it is a better thing for the people who have good butter to eat. And what the people will have to do is to come back to the farm and make a little more of these agricultural products and eat them at home, instead of having them brought into the city where you have to pay for them. (Applause.) It is a fashion in Canada to say that agriculture is the basis of our prosperity. I do not wish to insist upon it that in a comparatively new country like this, in a country where we have such a vast expanse of fertile soil calling for cultivation, calling to be dealt with, that it might produce the food not only for the people of Canada but for the people of all parts of the world as well. It seems to me a pity that that condition of affairs is allowed to continue, and our young men and women should turn their attention to other callings, and should neglect this important calling of agriculture. Mr. James has spoken of the fact that farming to-day has to be carried on by educated men and women. It is, I believe, an actual fact that here in the Province of Ontario the men who are doing the best on the farms of this Province are the men who graduated from the Guelph Agricultural College. We do not want the people of this country to grow up in the condition of the people of the tropics, who simply have to lie on their backs and let the fruit of the trees fall into their open mouths. We want the people to grow up to have to toil for their livelihood, and to grow up strong, vigorous people, and to make a great nation of this continent. The men who have the best education, and who know how to farm scientifically, are the men who are going to make the greatest success of their farm life in this Canada of ours. I appeal to any of you who have left the farm, many of you who have sons and daughters growing up in the city. Let them come back to the farm and learn to produce the food they eat, and they will be a happier people in time to come, and will rear better families out in the country than in the city streets. They will build up a better nation here in Ontario to hand down to our descendants than we have received from our forefathers, and it will be better for the work they are doing in the present day. (Applause.)

THE CENTRE OF THE WORLD.

By Thos. McGillicuddy, Department of Agriculture, Toronto.

After making some pleasing local allusions, and telling a couple of apt humorous stories, the speaker proceeded to say: When I was a very small boy, I climbed to the roof of our little house, and there I made a wonderful discovery: That our home was the centre of the world! I told the members of my family and the neighbors about it, but those who didn't say "Nonsense," smiled at me. I stoutly maintained that our house was the centre of the world, and offered to prove it to anyone who would accompany me to the roof, by showing them that the sky came down at equal distance all around it! (Laughter and applause.) That humble abode was indeed the centre of a domestic world—with a limited horizon, it is true—but out from it have gone influences that still vibrate.

Each of us, and all of us, are world centres. Consciously or unconsciously, we are being influenced by, and are influencing one another. Emerson brings this thought out strikingly in his poem "Each and All":

"Little thinks in the field yon red-cloked clown
Of thee, on the hilltop, looking down.
The heifer that lows on the upland farm
Far heard, lows not thine ear to charm.
The sexton tolling the bell at noon
Dreams not that great Napoleon
Stops his horse and lists with delight,
Whilst his files sweep round yon Alpine height.
Nor knowest thou what argument
Thy life to thy neighbor's creed hath lent."

A CENTRE FOR DAIRY CONSULTATION. Picton is to-night a dairy world centre. It is the Mecca of the Eastern Ontario dairymen just at present, and the pilgrims are indeed a happy, joyful band. (Laughter.) The eyes of the agricultural, commercial, and political worlds are for the time being focussed upon Picton. Those keen young men at the press table will make the telegraph wires hot to-night as they send off their reports to the daily press; and to-morrow morning bankers, merchants, journalists, and politicians, will eagerly scan the papers to see what has been said and done by the men who have gathered at this splendid convention. Why? Because, as the poet has said: "The farmer feeds them all."

DAIRYING IS A SOCIAL CENTRE. This great assembly to-night suggests that the dairy industry closely touches the community on the human side. Every cheese factory is a social centre. Opinions as well as products are there interchanged; minds as well as pocket-books are expanded by factory intercourse. A well-conducted cheese factory in a rural community is, next to the home, the church, the school, and the public library, a social refiner and educator. A beautiful German legend says that the hut of a poor fisherman was changed into a temple of exquisitely wrought silver by a certain tiny lamp being lighted and placed within it. Many of my older hearers have known something almost as marvellous as that to have taken place in our own Province. They have seen the humble log houses of the early settlers quickly transformed into mansions of brick and stone by the advent of the cheese factory. (Applause.)

MODERN DAIRYING IS A SCIENTIFIC CENTRE. The chemist and bacteriologist have each an ever enlarging field of investigation and counsel in connection with the handling of milk and its products. Adulteration and taints are traced to their origins, and can thus be corrected. Butter and cheese making is being more and more reduced to a science. Technical knowledge that was formerly the portion of the cultured few is now being possessed by many of the skilled dairymen of Canada, and the old rule of thumb has been relegated to the shelf with grandfather's clock. The chemists and bacteriologists who have done investigation work in connection with our Ontario cheese factories have saved the country tens of thousands of dollars within the past seven years, and have done so at a minimum of cost. The farmer of to-day is not scared at the appearance of the scientific professor; he knows that he is a man, a brother, and a friend, as well as a learned specialist.

DAIRYING IS A MANUFACTURING CENTRE. The dairyman is a manufacturer. By devising and feeding well balanced rations he helps the cow to make milk more copiously and more cheaply for him, and in that way he is a manufacturer of the increased yield. By co-operating with the cheese-maker the farmer who supplies milk to the factory also becomes a manufacturer of cheese or butter, a finished product in concrete form, and easily handled for the home or foreign market. It is estimated that butter and cheese to the value of $23,000,000, were exported from Canada in the year 1907, and in addition to this a fair portion of the bacon product exported may also be claimed as a dairy side line. In the county of Prince Edward in 1906, cheese to the value of $586,661 was made. Patrons to the number of 1,916 were paid $521,484 for their milk, an average of $272 a patron. As each patron represents from four or five of a household, this means that nearly 10,000 persons in this small but prosperous county are more or less dependent upon the cheese industry for a living. (Applause.)

DAIRYING IS A CO-OPERATIVE WORLD CENTRE. In dairying, as in religion, "No man liveth unto himself." Cheesemaking is the largest co-operative business we have. There are about 60,000 patrons of the cheese factories of this Province. Many of these factories are directly, and most of them indirectly, co-operative in character. My own opinion is that much of the growth of the public ownership idea in Ontario can be traced to the influence of the co-operative cheese factory. It certainly has suggested the possibilities of more generally united action in business matters relating to the public at large.

The dairy world is to be saved and upheld bv some measure of faith, and by a very large endeavor along the line of good works.

NOTES ON A SEASON'S EXPERIENCE IN MONTREAL.

BY GEO. H. BARR, DAIRY DIVISION, OTTAWA.

The export trade of butter and cheese from the port of Montreal for 1907 is 2,040,190 packages, valued at $19,635,541. To receive into the warehouses between 20,000 and 30,000 boxes of cheese between 5,000 and 8,000 packages of butter a day, requires extensive warehouse accommodation, and to inspect these goods, and to export between 50,000 and 100,000 boxes of cheese each week requires a splendid system of handling the goods and rapid inspection.

The condition of the butter and cheese upon arrival in Montreal would indicate that during the hot weather in the summer there should be some system of controlling the temperature on the river boats for both butter and cheese, and a more general use of iced cars for cheese, as many of the cheese arrive in a heated condition, especially when shipped in ordinary box cars.

The Government cargo inspectors report very great improvement in the condition of the cheese boxes last year compared with former years. Still there is room for much improvement, as many of them arrive in a broken condition, and even after being coopered they present anything but an attractive appearance as they are being loaded on the steamer. The butter boxes are fairly uniform in style, but they are often not as clean as they should be.

There is room for very great improvement in putting on the factory brands, and weights of the cheese. Many of them are indistinct and put on any old place on the boxes, giving them an untidy appearance. There are still two many pencils used instead of stencils for marking the weights.

There are immense sums of money being spent in equipping the warehouses in Montreal with the most modern cold storage facilities for butter and cheese. At some of the warehouses, the cheese are put directly from the drays into cool rooms where the temperature is about 45 degrees. There are still some warehouses, however, where the cheese often stand for days where the temperature is almost as high as outdoors and the quality is injured considerably.

It should be the duty of every salesman to acquaint himself with the facilities each warehouse has for taking care of the cheese properly. I am of the opinion that the system of inspecting cheese and butter, which is generally adopted in the warehouses of Montreal, is not in the best interests of the trade, not is it as fair to either buyers or sellers as it should be.

All inspection or examination of butter or cheese after it is sold should show as far as possible the actual quality of the whole lot. This is impossible under the general practice in the warehouses, of testing a percentage of the packages, selected at random and judging the quality of the whole lot by the result of this examination. I believe the inspecting at the present time is done fairly and as accurately as it is possible under the present system, but it is not done as thoroughly as it should be and can be done if the factories would adopt a uniform and honest system of marking the cheese from every batch or vat, and the butter from every churning. If this were done, it would then be possible to select one package from each vat or churning and when these were examined, an absolutely correct indication of the quality of the whole lot would be obtained, without injury by unnecessary use of the trier. It often happens that the cheese from one vat or the butter from one churning is very inferior in quality,while the rest of the shipment is quite up to the standard.

When the inspection is made under the present method, one or two of these inferior boxes or packages may be in the number examined and the whole lot is rejected, but if each batch or churning were numbered, the packages representing the inferior batch could be easily set aside and the reduction in price figured on the actual quantity of inferior butter or cheese instead of being averaged for the whole lot.

Let me give a couple of instances that happened during the past season. I was called upon to examine a lot of 31 packages of butter which were rejected on account of the flavor. No fault was found with anything else. A representative of the creamery being present, I asked him to pick out five packages for me to examine. I found two in the five with a strong, leeky flavor, and, of course, put the lot second grade. I said to the creamery man: It is just possible there is only one churning with that flavor, but we cannot try every package." He found out from the maker that this was the case, and immediately bought a set of rubber stamps and has numbered every churning since. The merchant made a cut of one-half cent a pound on the lot, amounting to $8.68, which was equal to a little over three cents a pound on the five boxes which were wrong in flavor.

The other case was on cheese. Five boxes had been examined, and two were found wrong in flavor. When I went to look at them, I saw the batches were numbered, and asked to see a box of each batch and found all the batches but one, fine. The two cheese the inspectors found wrong had the same number. The merchant was pleased to know that he had a fine lot of cheese when the five inferior ones were picked out.

I found quite a number of such cases later on in the season when quite a few of the factories in Quebec were making batches. The numbers may be put on with half inch or three-quarter inch rubber stamps and should be put near the factory brand.

If the cheese is made in two vats at the factory, the first day's make would be marked 1 and 2, the second day's make, 3 and 4, and so on up to the date of shipment. Then commence again with No. 1. The churning of butter could be numbered in the same manner.

I found the chief defects in the cheese which I examined as follows: Nearly 90 per cent. not clean in flavor; 60 per cent. open and loose in texture; 33 per cent. acidy and mealy; 29 per cent. too soft or weak in body; 22 per cent. uneven or too pale in color; 15 per cent. poor finish, mouldy or stained surface.

It will be seen that "Not clean in flavor" is the chief defect, and is due, no doubt, largely to taints in the milk. Yet frequently the flavors appeared to be caused by the use of bad starters and impure water at the factories. There were very few cases where defect in flavor could be described as "food-flavors." In the spring, a number of lots had a weak, leeky flavor, caused probably, by the cows eating leeks.

Loose and open texture, which is the next greatest defect, appeared to be caused by leaving too much moisture in the curds, either by insufficient cooking or not stirring the curds sufficiently when the whey is removed and by salting the curds too soon.

Acidy and mealy texture is a very common defect, and is usually due to too much acidity in either the milk or curd, and by the use of too much salt on the curd.

Soft or weak body is a defect very common in the extreme eastern part of Ontario, and some districts in Quebec. Insufficient cooking of the curd and leaving an excessive amount of moisture in the curd after the whey is removed, not only gives a soft or weak body, but often injures the color as well. Quite often the color was mottled by mixing in old curd, especially about the time the cows were going out on the grass in the spring, and again in the late fall when they were beginning to get any food.

The following figures will give a fairly good idea as to the size of the factories which are turning out inferior cheese. In most cases the number of boxes in each lot represents a week's make of cheese.

6.5 per cent. of the lots examined contained over .... 100 boxes
93.7 " " " " " " under............... 100 "
83.3 " " " " " " " .... 70 "
43.7 " " " " " " " .... 40 "

It must be remembered that these were cheese which had been suspected or objected to by merchants. Bearing in mind that about 98 per cent.* of the total lots examined were second and third grade, it will readily be seen that the great majority of our inferior cheese come from small factories. It does not necessarily follow that fine cheese cannot be made in small factories, but it is true that the best men cannot be secured to operate them. It requires men with decidedly greater ability to manage a large business than to manage a small one, and just as long as we have small and poorly equipped factories, just so long will there be weak and inferior cheesemakers in them, and one of the solutions for doing away with a great many of our second and third grade cheese is larger factories, with strong and capable men to operate them.

Now the defects in our cheese and butter are not so very serious. We are not making a whole lot of third grade and cull goods, but as Canadians, we are making too many second grade goods.

With the splendid system of instruction at the factories and creameries, the dairy schools, the dairy literature and information distributed by the different Governments, dairy papers and dairy meetings, there is no good reason for ignorance regarding any line of our dairy industry.

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*See letter of J. A. Ruddick following discussion of this paper.

What we need is, that each one, from the boy who brings up the cows from the pasture, to the man who puts our cheese and butter on board the steamers for Great Britain, shall do his work in the very best manner. Will you do it?

Mr. Ayer: Mr. Barr is the farmer's friend in Montreal, and he gives the merchants blazes. (Laughter and applause.)

The Chairman: You have a good time now to thresh this matter out. If any of you have any complaints to make, or desire any information, ask for it right now or forever after hold your peace.

Mr. E. A. Calnan: Many of our factories are equipped with cold storage, and we believe we put out a first-class cheese, but sometimes they do not arrive in Montreal in first-class condition, and we would like to know if there is any weakness in the cold storage at any point along the road?

Mr. Barr: I think that in Prince Edward County you ought to ship carefully. Have your cheese shipped to Montreal in refrigerator cars. I saw some of the cheese from this county last year during a very hot spell, and I found that the heads of the cheese were very much more open in Montreal than they were in the factories. If these cheese had been sent down in an iced car instead of by river boat, I think the conditions would be different. You have to be as careful in making cheese if they are cooled in a cool-curing room as you have in any other place. Do not try to leave a lot of moisture in the curds and think because you have a cool-curing room you will get nice meaty texture.

You must not think because you have cool-curing rooms that you can let up in any way in the matter of making. Be careful that they are delivered in Montreal in the best condition.

A Member: Do you think the cheese are hurt more by being drawn on wagons six or eight miles in the sun than they are by going up on the boat? I have seen a good many cheese shipped from this port that I think were taken the best of care of while on the boat, but standing here in the sun I think they were hurt because there was no cover on the wagons.

Mr. Barr: These are things you will have to be careful about. There is no use keeping cheese in cool-curing rooms and then taking them out in the sun at temperature of 90° and then sending them down in a boat and keeping them two days at a temperature of 70°. Of course, boats are cooler than box cars, but you must be careful in the transportation of your goods.

Mr. John McGregor: Don't you think there should be more prompt delivery taken of the cheese? There is a great deal of time lost in Montreal in taking delivery. I have seen cheese stand on the waggons there for hours after they had been loaded.

Mr. Barr: Yes, that is true. Last year, especially, it was very difficult to get delivery of the cheese in Montreal on account of the strikes. I hope we will not have another season like that. These facilities will keep getting better. We will have the sheds at the docks in better shape and switches laid in on the docks into each shed. What Mr. McGregor says is only too true, especially in the C.P.R. yards. They are so crowded that they are scarcely able to handle the dairy products as they should. They do not get delivered as quickly or in as good shape as they do on the G.T.R., but they are trying to overcome these things.

The President: When you make out a report on cheese you make out a blank and you state the trouble and what is the matter.

Mr. BARR: I put on each certificate the defects in the cheese, and I try as near as I can to point out what I think is the cause of these defects. I often write to the cheese inspectors, both in Quebec and Ontario, and tell them what I think about it, and then they immediately get their inspectors out to these places.

The PRESIDENT: In the forepart of your remarks you mention that some of the warehouses were not in a proper state for taking more of these cheese. You intimated that it would be rather a delicate thing for you to name these warehouses.

Mr. BARR: I won't do it.

The PRESIDENT: If you are going to lay the blame on the cheese maker would not it be just as fair for you to locate the trouble in Montreal as to locate it in the factory? (Applause.)

Mr. BARR: Take some cases where the cheese are delivered, say on Tuesday, and they stand in the warehouse till the next Tuesday at a temperature of 50 or 60 or 70. You cannot expect these cheese to be in quite as good condition in a week's time as they were when they came in; and that is just what I mean. It is rather a difficult thing to know just what to do.

The PRESIDENT: You can never cure a patient until you diagnose the case, and find where the trouble is.

Mr. SINGLETON: Would it be possible for you as official referee where you are called in to give each lot a thorough examination? The system of taking off five of the first lot does not seem to me to be a good system. Have you time to make a thorough examination?

Mr. BARR: Not at the present time, but if you were numbering each batch of cheese, the warehousemen would have instructions to set aside a box of each number. Now they do not set aside any particular cheese; they pick them at random. There is no system of picking out each batch, and when I come to examine, I have got to examine them on the same basis as the inspector. I always look at some of the cheese the man inspected, and I look at others as well. I have to examine them on the same basis as the man who inspects them in the warehouse, and I must confess that I do not feel in my heart that I know exactly what one lot of cheese is like. I do not think any inspector in Montreal does; he has a pretty good idea, but that is all he can have.

Mr. AYER: I am very much obliged to Mr. Barr for bringing up this fairness, and we never will have fairness unless we have that done.

The PRESIDENT: Why not pass a resolution on that subject right now; it is very much in the interests of the cheesemaker?

Mr. AYER: I am very much obliged to Mr. Barr for bringing up this pet theory of mine. Until you adopt this plan of numbering the vats, just as they number the churnings of butter, you will never get a fair plan, but when that is done every merchant in Montreal will leave out one cheese of each number. Suppose you are making eight cheese in a vat, you will have eight cheese marked "1"; and if you have nine cheese in the next vat, you will have nine cheese marked "2," and if you have seven cheese in the third vat you will have seven cheese marked "3," and the next morning you will start with number 4, 5, 6 and so on.

One other point is the shipment in cars and by boat. Now I know the steamer "Alexandria" quite well—I see the captain here in the audience. He is sometimes blamed for a lot of the trouble, but I would rather have the steamer "Alexandria" in the worst day I could get it than to have a common box car on a hot day. The boat is not as good as a refrigerator car, but it is a mighty sight better than a box car.

The PRESIDENT: Would not it be a good idea to have all the vats number so and so?

Mr. D. M. MACPHERSON: I think you will find some difficulty in that regard; you not only make so many cheese of a certain vat each day, but there is every day in the week. There must be something to determine the day of the week as well as the vats. I think there should be some means of determining the number of vats in each day.

Mr. AYER: If you have 142 vats in your shipment the last vat will be 142.

QUALITY OF CANADIAN CHEESE.

The following communication which appeared in a well known Toronto weekly journal, explains itself:

To the Editor of the Sun,—Mr. Geo. H. Barr, a member of the staff of the Dairy Division, who was official referee of butter and cheese at Montreal last season, in speaking of his work at the recent dairy convention, held at Picton, Ont., made the statement that "only 2 per cent. of the cheese which he examined were of No. 1 grade." This statement has been widely quoted as showing a serious condition in the Canadian cheese trade. As there is nothing in the statement itself or in the facts of the case to warrant such a conclusion, I ask your permission to making the following explanations:

As Mr. Barr explained in his statement, he examined less than half of one per cent., or about one lot out of every 200 lots of cheese received at Montreal during the season, and further, as he was asked to examine only those lots which were suspected of being inferior in quality, or which had been condemned by the purchasers, it is not surprising that only two per cent. were first grade. The showing is a remarkably good one rather than a bad one. As a matter of fact, the quality of Canadian cheese never stood as high as it does at the present time. More improvement has been made in the last year or two than for many years previous. The writer has just returned from a lengthy visit to the markets of Great Britain and can speak with confidence on that point.

J. A. RUDDICK,
Dairy and Cold Storage Com.

OTTAWA, Ont.

REPORT OF CHIEF DAIRY INSTRUCTOR AND SANITARY INSPECTOR.

BY G. G. PUBLOW, KINGSTON.

It is with pleasure that I present to you my annual report as Chief Dairy Instructor and Sanitary Inspector for Eastern Ontario.

As a result of the passing by parliament of a sanitary law regarding the conditions surrounding the manufacture of dairy products in Ontario, it has become necessary this season to make a complete change in the system of inspection and instruction. Owing to the fact that all places wherein dairy products were being manufactured were to be regularly inspected by a sanitary inspector, it was decided by the Department to combine the work of inspection with that of instruction.

Syndicate.	Instructor.	Factories.	Full day visits.	Call visits.	Patrons sending milk.	Patrons visited.	Factories paying by test.	Samples tested for adulteration.	Watered.	Deficient in fat.	Amount of money from fines.	Fermentation tests.	Percentage out of condition.	Percentage of patrons with good facilities for cooling.	Factories improved.	Expenditure in new buildings and improvements.	Factories with cool-curing rooms.	New factories built.	Factories with milk testing equipment.	Makers qualified to test.	Factories making whey butter.
											$					$					
Alexandria ...	A. McDonnell......	37	57	160	1,067	35	4	1,020	2	5	120	700	75	5	25	2,000	....	....	9	15	....
Almonte......	W. J. Ragsdale.....	39	79	139	1,892	169	3	1,509	8	....	100	287	72	20	39	8,000	....	....	39	10	1
Belleville.....	Hugh Howie.......	41	55	214	2,119	137	....	4,500	1	....	......	86	100	20	20	7,700	6	....	10	5	....
Brockville, E..	A. H. Wilson......	49	94	103	1,777	83	3	1,154	2	....	50	616	40	75	28	13,665	....	3	7	5	3
Brockville, N.	P. Nolan...........	47	103	209	1,197	82	....	2,522	2	2	65	762	15	50	25	6,460	1	3	7	7	1
Brockville, W.	S. S. Cheetham.....	41	102	156	1,028	136	5	1,094	16	7	140	363	55	10	38	18,480	2	4	8	6	....
Campbellford..	R. T. Gray.........	39	79	181	1,661	121	....	1,807	5	2	25	277	40	50	14	5,000	1	1	6	10	....
Chesterville...	L. A. Zufelt........	40	43	318	977	146	14	120	1	....	75	90	20	50	17	1,200	...	1	5	15	....
Cornwall	J. Buro............	36	32	377	1,200	100	17	395	3	2	......	100	50	30	35	8,765	....	1	26	12	2
Finch	C. B. Larry	39	104	231	1,327	254	....	542	3	....	......	931	50	20	17	1,117	....	....	8	2	....
Kemptville....	W. G. Gardiner	47	100	144	1,741	134	10	672	3	4	50	150	62	10	25	5,845	....	1	12	10	1
Kingston	H. Brintnell........	38	92	89	1,327	242	...	1,465	5	3	70	195	85	15	16	5,000	....	1	20	7	1
Lindsay	D. J. Cameron......	35	42	168	2,035	176	5	594	....	....	......	38	50	2	25	1,500	....	....	18	19	....
Madoc........	J. B. Lowery.......	39	56	118	1,195	129	....	95	1	....	10	141	85	10	29	11,632	2	3	12	5	....
Morrisburg....	C. W. Norval.......	41	36	346	1,230	100	2	431	5	1	......	236	8	80	21	1,500	....	1	14	10	1
Napanee......	Geo. Bensley.......	43	45	285	3,500	250	....	1,500	4	2	75	117	25	10	38	15,000	4	3	15	9	....
Ottawa........	W. W. Dool........	37	41	167	984	20	7	614	6	1	168	......	....	50	15	2,700	....	....	19	18	....
Ottawa, E	I. Villeneuve.......	40	75	223	1,300	200	10	1,850	8	4	45	501	90	10	33	4,325	....	2	6	4	....
Ottawa, W....	R. E. Elliott........	39	40	170	2,000	50	1	700	....	....	......	102	45	50	21	1,850	2	....	19	25	....
Perth.........	J. H. Echlin	38	39	155	1,587	72	....	2,930	1	3	30	101	29	30	11	6,750	....	3	22	28	2
Peterboro.....	R. W. Ward........	37	37	354	1,796	387	11	115	1	....	......	74	30	21	37	6,798	3	....	20	25	2
Picton........	C. A. Publow	36	30	273	2,961	112	....	1,840	1	....	.....	228	50	50	27	11,900	14	2	18	18	....
Plantagenet ..	J. Charbonneau	51	47	258	1,209	59	2	1,780	5	7	150	204	57	5	24	5,060	1	....	10	14	....
Vankleek Hill.	W. G. Graham......	46	73	184	1,518	175	1	1,432	2	21	115	725	40	10	25	1,615	....	....	5	5	....
	Totals........	975	1,501	5,022	38,583	3,369	95	30,681	85	64	1,288	7,024	....	......	605	153,862	36	29	335	284	14

To give the instructors the independence that it was considered advisable they should have, and as an inducement for makers to take advantage of instruction, the services of the instructors were given free of charge. This enabled them to devote as much time as they found necessary at any particular place to make the required improvements.

This year the number of instructors was reduced from twenty-eight to twenty-four, and the territory, which comprises all that east of Toronto, and in which there are 975 cheese factories, was divided into 24 districts with about 40 factories in each. Over each district was placed an instructor whose duties were to visit each factory to see that it was kept in a clean, sanitary condition and provided with a pure water supply, to give instructions in the manufacture of cheese, and where it was found necessary, to visit the farms of any patrons who were delivering milk which was found to be out of condition; and to test milk for adulteration where factorymen had good grounds for suspicion that the milk was being tampered with.

The men engaged for this important work were cheesemakers of long experience in the management of factories and who held a diploma from one of our dairy schools.

Rather than weary you with an account of the individual work done in each district, I have prepared a tabulated statement, showing the names of the factories in each group, with a summary of the work accomplished by each instructor.

From this summary it will be seen that 975 factories were regularly visited, and of this number 178 received instruction and inspection for the first time. Full day visits to the number of 1,501 were given, and 5,022 call visits, making a total of 6,523, or an average of over six visits to each factory. It will be understood that full day visits were made only at the request of the maker or factory manager, and, with the exception of their duties as sanitary inspectors, the services of the instructors are altogether optional. It is expected, however, that when makers are in trouble they will acquaint their instructor with the fact, and invite him to render them what assistance he can in overcoming their difficulties.

It was our intention at the outset that the farms of all the patrons should be inspected, but it soon became necessary for the instructors to devote so much of their time to assisting the makers in matters pertaining to the manufacture, that this was found to be impossible, and only the farms of those who were delivering milk out of condition could be visited. There were 38,583 patrons sending milk to the factories in the 24 groups, and to personally visit the homes of all these would require more time than could be devoted to this work by the limited number of instructors.

7,024 fermentation tests were made (of samples of milk of doubtful quality) to determine the condition of the milk, and about 75 per cent. of the samples tested were found to be out of condition, either by being overripe or of bad flavor.

The farms of 3,369 patrons were personally visited by the instructors, to see if the causes of these defects could be located at the source of supply, and many more would have been visited had it not been that many of the patrons delivered their own milk. These visits revealed the fact that 90 per cent. of the defective samples were delivered by patrons who gave little or no attention to the cooling of the milk or the sanitary conditions surrounding its production. While there is a general improvement in the condition in which the milk is being delivered at the factories, not more than 50 per cent. of the patrons have appliances necessary for efficient cooling during the warm weather, or give little or no heed to the sanitary conditions under which the milk is produced.

30,681 samples were tested for adulteration; 85 of these showed added water and 64 were deficient in fat, this number being 131 less than last year. The amount of fines imposed on the offending parties amounted to $1,288. This is one of the most disagreeable features of the instructor's work, and I think they should be relieved of it, as it takes up a great deal of time that could be spent much more profitably. The remedy for this lies in the paying for milk according to quality, which I consider the proper thing to do; for it would remove the tendency to dishonesty, and would also encourage the production of milk of better quality. But this cannot be done until factories adopt the system of paying by test, and this would appear to be a long way off, as only 95 factories in Eastern Ontario are doing so at the present time. Thus it will be necessary to still give attention to the testing for adulteration. I think it would be well to have men appointed specially for this work, whose duty it would be to look after the testing and prosecuting. As it is at present, the prosecuting is left in the hands of the factorymen. Generally speaking they do not wish to deal with the matter, and many cases that should be dealt with are allowed to go by default.

It is very gratifying to be able to report a very marked improvement in the condition of the factory buildings and surroundings. While there is yet a great deal to be done in some of the districts in the way of improving the sanitary conditions, yet on the whole, the factories were never in such good order as they were this season.

Twenty-nine old factories were replaced by new ones and 605 made improvements in different ways. The estimated value of the expenditures, including new buildings, was $153,862, which is $33,874 more than in 1906.

With very few exceptions the factorymen responded quite readily to the recommendations made by the inspectors; in fact many of them spent more than the profits from their business would warrant. While a considerable portion of this amount was spent in improving the curing-rooms, yet there are only 36 factories that have what are known as "cool-curing rooms," or facilities for controlling the temperature at all seasons, and 17 of these are to be found in the Prince Edward district. This is a matter that is worthy of much greater attention from factorymen than it receives, as the having of these conditions makes it possible to turn out cheese of much superior quality, for which I am glad to know that the buyers have been paying more than the ruling price this season; and besides, it gives the factorymen an independence in many ways that he does not otherwise enjoy.

Notwithstanding the more critical inspection by the buyers this season, the May and June make of cheese was reported as the best in the history of the trade; but as soon as the warm weather set it, general complaints were received regarding flavor, texture, and closeness. The openness was largely due to insufficient maturing before salting; the coarseness in texture was largely due to the too heavy salting of the curd and the receiving of over-ripe milk and the treatment given in its manufacture, the makers in many cases being forced to receive milk of this character owing to the keen opposition that exists between factories. As long as makers will continue to accept milk in this condition it will be practically impossible to overcome these defects. Very little complaint was made about the finish and boxing of the cheese, and there has been a marked improvement in this respect. In the districts where the whey was returned in the milk cans from whey tanks that were badly located or not properly cleaned, the greatest number of complaints regarding flavor was received, and while a special effort has been made by the instructors to have these conditions improved, owing to the lack of knowledge by the milk producers of the principles of fermentation, it was difficult to have them realize the necessity for the care that it was asked should be given to the tanks and whey. While I believe the whey tanks to be the most fruitful source of contamination at the factory, it was the one improvement which met with more opposition than to all the others asked for. It would appear as though one or two things would have to be insisted upon: Either that the necessary care be given to the tanks to keep them perfectly clean, or that the whey be pasteurized, and the latter would appear to be the most effective remedy. In several factories that were having bad flavor the trouble was located in the water supply. Whenever it was suspected that the water supply was contaminated, and before parties were asked to go to the expense of providing a new supply, samples were sent to Dr. Connell for analysis, and the result of his investigation was given to the persons responsible. Many samples of milk, whey and cheese also were analyzed by the Doctor, and this we found of great assistance to us in locating and dealing with many bad flavors and other defects, of which Dr. Connell will likely deal in his report.

While it is true that the laws governing these conditions are quite plain, it was thought best by the Department that the court should not be resorted to until every effort had been put forth, through education, to acquaint the people with the requirements of the law, and as a means of accomplishing this, a series of special district meetings have been held, numbering in all during the season, 26. These meetings had an average attendance of 130. A report was given by the local instructor of the conditions as they existed in his district, and the conditions were clearly and forcibly discussed. I believe that this will be a great factor in bringing about the improvements necessary for another year. Right here I would like to take the opportunity of expressing my very hearty appreciation of the services rendered by the Directors of this Association, in connection with these meetings, as to their untiring efforts is largely due their splendid success. A further means, and one which should prove very effective, is the supplying of speakers by the Department, as far as possible, to the annual meetings of all factories that make application. Some 210 of these have been attended up to January 1st, and as the majority of the annual meetings are not held until after this date, it is expected that a much larger number will be attended before the opening of another season. There is no doubt that these meetings will prove a great factor in bringing about the co-operation between producer and manufacturer that it is necessary must exist before we can reach the standard of perfection at which we aim.

A new feature that was introduced into some of our factories this season, and one that has created a great deal of discussion among the factorymen, was the skimming of the whey and the making of whey butter. At the end of the season some fourteen factories were engaged in this work. I think it is well to sound a note of warning regarding this matter, and I would advise any person who has not a butter plant in connection with his factory to make no provision for any such work until we have sufficient proof that it will pay to do so. It should be understood that the factories that have been engaged in this work were previously equipped for butter making and have been able to enter into the matter without much extra expense, which may have made it possible to carry on the work more or less profitably. My opinion is that where the milk is properly cared for and skilfully handled in the manufacture of cheese, it will not pay to adopt the practice unless the output is very large. Then there is the danger of the making of the cheese being neglected, and the injury that might come to the reputation of Canadian butter, and should the system become generally adopted might require legislation compelling the branding of the butter.

The instructors will remember the season of 1907 as one involving many special duties and which required that tact and good judgment should be used. It is very gratifying to me to be able to report that the work is being carried on without any serious complaints being made. The instructors have been very faithful in their duties and untiring in their efforts in dealing with the difficulties met in their respective districts. They have all succeeded in bringing about marked improvements, and in doing so they have been careful not to abuse the authority given them.

On the whole the cheese were not shipped nearly so green as what they were last year, yet in some of the districts the instructors were seriously handicapped owing to the closeness to the hoops with which the cheese were being shipped, and had to be governed to a certain degree by reports from Montreal. In this respect we received valuable assistance from Mr. Barr, the official referee, from whom I received weekly reports on the quality of all cheese he was called upon to inspect. From this information I was able to keep the instructors well posted and to notify them without delay whenever any of their cheese were being faulted. As a result of this direct information it was generally possible to have the defects remedied in a very short time, and it was seldom that the same factory would be reported on the rejected list two consecutive weeks. I would like to express my appreciation of the splendid service rendered by Mr. Barr in this respect. So long as the present system of having cheese go to Montreal for inspection prevails, I believe it is necessary that we have on official referee at that point, and I am sure that no better man than Mr. Barr could have been selected for the position.

Before closing, I wish to thank the Executive Committee of this Association for the hearty support they have given me in conducting the work of the season, in which more progress has been made than in any previous year.

Factories in Mr. McDonnell's Group.

Pine Hill, Dalhousie Mills, Central, Banner No. 1, Glen Nevis, Aberdeen, Pine Grove, Union, Heather Bloom, Glen Dale No. 2, Glen Roy, H. T. 155, Glendale, Glen Gorden, Glen Norman, Fairview, Apple Hill No. 2, St. Raphaels, Picnic Grove, Banner No. 2, Balmoral, Bainsville, Green Valley, General Roberts, Curry Hill, Highland Chief, Glengarry, Western Star, Bridge End, Glen Robertson, Victoria, McLaughlin, Lorne, Dorney, Kirk Hill No. 7, Baltic Corners, Greenfield Union.

Factories in Mr. Charbonneau's Group.

G. 145, Green Bank, 918, Stone Brook No. 1, Stonebrook No. 2, Lot 5, Con. 6, Canada 225, A. F. W., G. 604, 6th Con., Alfred, Empire, Brook Co-operative, Grand River, Canada No. 2, Higher Brook, Canada, G. 871, A. C. 5, Parisien, North Indian, Perfection, Mount Royal, T. W. No. 1, 875, Stafford, Ottawa Valley No. 2, Stone Brook, C. T. No. 3, A. C. 4, G. 868, J. Q. No. 2, F. 32, H. C. No. 2, Ottawa Valley No. 1, C. T. No. 2, Empire B., A 35, Bolt, The Brook, 238, G. 870, O. B., Cobb's Lake, E. L. No. 1, C. W. 5, J. Q. No. 1, Centre, C. T. No. 1, E. T., F. 32.

Factories in D. J. Cameron's Group.

Fleetwood, North Verulam, Dunsford, Missing Link, Crown, Hope, Cameron, Bensfort, Cambray, Mount Pleasant, Bobcaygeon, Maple Leaf, East Emily, Hampton, Cavanville, Mariposa, Cold Springs, Ballyduff, Perryton, North Harvey, Seymour West, Omemee, Red Rock, Reaboro, Janetville, Cedardale, Palestine, Baltimore, Star, Fraserville, Orono, Myrtle, North Ops, Darlington, Buckhorn.

FACTORIES IN MR LOWERY'S GROUP.

Fraser Creek, McClure, Ormsby, Cold Springs, North Star, Brook Valley, Madoc, Beechmount, Faraday, Rose, Bronson, Mayo and Raglan, Limerick, Daisy, Cook's, Spring Creek, Spring Hill, Haliburton, Coe Hill, Vansickle, Hybla, Mayo and Carlow, Millbridge, Deloro, Riverside, Oak Leaf, Cashel, Deer Lake, The Ridge, Green View, Walkerville, Eldorado, Marmora, Alexandria, Queensboro', Bangor, Lake View, Champion

FACTORIES IN MR. BENSLEY'S GROUP.

Deseronto, Kingsford, Sheffield, Moneymore, Fifth Lake, Centreville, Farmer's Friend, N. E. L., Odessa, Ideal, Napanee, Palace Road, Forest Mills, Clareview, Albert, Bellrock, Camden East, Phippen No. 1, Excelsior, Bayview, Elm Grove, O., Selby, Croyden, Maple Ridge, Enterprise, Moscow, Metzler, Phippen No. 2, Emerald, Collin's Bay, Empey, Union, Newburg, Tamworth, Marlbank, Whitman's Creek, Petworth, Wilton, Phippen No. 3, Stella, Cataraqui, Glenvale.

FACTORIES IN DR. PUBLOW'S GROUP.

Glen View, Quinte, Bloomfield, Union, Royal Street, Elmwood, Acme, York, Salem, Edville, Hyland, Wellar's Bay, Union Vale, Waupoos, Ben Gill, Maple Leaf, Rogers, York Road, Colborne, Massassaga, Cherry Valley, Cloverdale, Black River, Bethel, North Port, King, Cedar Creek, Wicklow, Mountain View, Allisonville, Cressy, Point Travers, Elmbrook, Bayside, Wooler, Brighton, Grafton.

FACTORIES IN MR. HOWEY'S GROUP.

Thurlow, Bronk, Thomasburg, Rock, Marble Spring, White Lake, Sidney Town Hall, Otter Creek, Foxboro', Moira, Cloyne, Shannonville, Silver Spring, Premier, Stoco, Bogart, Glenn, Frankford, Kaladar, Ketcheson, Eclipse, Mountain, Rosebud, Roblin, Murphy, Victoria, Roslin, Zion, Boundary, West Huntingdon, East Hastings, Melrose, Moira Valley, Cedar, Clair River, Tweed, Plainfield, Sidney, Union, Beulah, Halloway.

FACTORIES IN MR. BRINTNELL'S GROUP.

Hinchinbrooke, Mount Hope, Mountain Grove, Forest No. 1, St. Lawrence, Cold Spring, Excelsior, Latimer, Sydenham, Desert Lake, Parham, Arden, Elm Dale, Ontario, Gilt Edge, Sand Hill, Battersea, Railton N. 2, Harrowsmith, Frontenac, Maple Grove, Long Lake, Wolf Island, Arrigan, McGrath's, Duff's, Perth Road, Hartington, Mountain Vale, Harlow, Reynold's No. 2, Silver Spring, Sunbury, Corn Flower, Model, Railton No. 1, Reynold's No. 1.

FACTORIES IN MR. NORVAL'S GROUP.

Glen Becker, Fairview, E. W. No. 28, Elma, Oak Valley, Haddo, Model No. 3, Glen Stuart, Edwards No. 2, B. C. No. 1, Central, Toys Hill, E. W. No. 5, E. W. No. 3, Carlyle, F. F. No. 1, St. Lawrence, Model No. 2, Matilda Centre, Edwards No. 5, G., Matilda, Mountain View, E. W. No. 6, Morrisburg, Hesse's No. 1, F. F. No. 2, Matilda West, Model No. 1, Maple Hill, A. A. L. No. 1, Spruce Grove, Bouck's Hill, E. W. No. 15, South Matilda, Ashton's No. 1, Pleasant Valley, Minto No. 1, E. M., Edwards' No. 1, P. and L., Strathcona.

FACTORIES IN MR. ECHLIN'S GROUP.

Fallbrook, Lanark and Drummond, Ardoch, Bathurst Mutual, Watson's Corners, Tennyson, Tayside, D. and L. Union, Boyd's, Scotch Line, Parkhill, I. X. L., Plevna, Drummond, Mississippi, Roland, Middleville, Clayton, Elite No. 3, Drummond and Elmsley, Harper's, Rosedale, Wensley, Zealand, Maberly, Clyde, Old Ferry Road, Oso, Star, Balderson, Stanleyville, Fernleigh, Brooke, Hopetown, Dalhousie Lake, Elphin, Joe's Lake, Vennachar.

FACTORIES IN MR. ELLIOTT'S GROUP.

Admaston, Corona, Equal Rights, Glasgow, Huntley Centre, Micksburg, Packenham, Snake River, Queen's Own, Westmeath, Bonnechere Valley, Carleton Model, Elmdale, Greenwood, Kidd's No. 4, Osceola, Rankin, Thistle, Victoria, Stonebrooke, Beachburg, Diamond, Forester's Falls, Gold Medal, Maple Hill, Pine Grove (Mc), River View, Union Star, Woodlawn, Jackson, Cobden, Dirleton, Grattan, Hazledean, Madawaska, Pine Grove, Shady Nook, Union Pride, Waba.

FACTORIES IN MR. GRAY'S GROUP.

Trent Valley, Braen, Ryleston, Spring Brook, Evergreen, Plum Grove, New Evergreen, Dartford, Harold, Centreton, Empire, Prince of Wales, Stanwood, Bell, Stirling, Avon Bank, Norham, New Model, I. X. L., Castleton, Kimberly, Crow Bay, Maple Leaf. Enterprise, Shamrock, Monarch, Percy, Seymour West, Burnley, Brickley, Forest, Hoard's, Spry, Kingston, Central, Codrington, Beaver, Woodlands, Spring Valley.

FACTORIES IN MR. CHEETHAM'S GROUP.

Caintown, Warburton, Junetown, Tilley, Gem, Taylor, Escott Union, Marlbank, Rockport, Selton, Escott Centre, Lorne, Fairfax, Rose Hill, Pine Grove, Wilson's No. 1, Springfield, Wilstead, Woodburn, Gananoque Jct., Cheeseboro', Anglin, Granite Hill. Marble Rock, Maple Leaf, Rapids Valley, Gananoque, Morning Star, Mallorytown, Pine Hill, Mallory's, Leeds County, 1,000 Islands, Aberdeen, Cold Brook, Lansdowne. Jackson, Keenan & Sons, Central, Howe Island, Sand Bay.

FACTORIES IN MR. WARD'S GROUP.

Round Lake, Apsley, Oakdale, Pine Grove, Star, Daisy D., Lang, Roseneath, Keene, Glenalda, Young's Point, South Burleigh, Westwood, Stoney Lake, Victoria, Oakdale, Villiers, Fenella, Maple Leaf, Clydesdale, Lakefield, Trewern, Oak Lake, Killarney. Indian River, Ormond, Otonabee Union, Warminster, Chandos, Warsaw, Selwyn, Trent Bridge, Norwood, Shearer, Shamrock, Central Smith, North Dummer.

FACTORIES IN MR. RAGSDALE'S GROUP.

Maple Hill, Mayberry, Rockspring, Farmers' Friend, Rideau Star, Prospect, Lombardy, Mississippi Pride, Farmers' Own, Carleton Place, Montague Centre, Old Fairfield, Island Queen, Valley Queen, Reliable, E. W. No. 20, Maple Valley, Newbliss, Ashton Union, Rideau Queen, Willow No. 2, Union, Orchard Valley, Lone Star, Crystal Spring, Golden, Maple Leaf, Appleton, Kitley, Roseville, Independent, Irish Creek, Standard No. 1, Elm Grove, Pure Gold, Black's Corners, Rosebank, Mount Zion, Clear Spring.

FACTORIES IN MR. P. NOLAN'S GROUP.

Newboro, Model, Crosby, Glendower, Centreville, Elgin Model, Gilt Edge, Morton. Long Point, Spring Vale, Ardmore, Black Lake, Mapleton, Westport, Forfar, Fish Creek, Bedford Mills, Bush Model, Smith's Valley, Island City No. 2, Ideal Canada. Rockdale, Cedar Bridge, Fermoy, Lake View, Portland, Ontario, Tichborne, Maple Grove, Seeley's Bay, Island City No. 2, Grand Central, Cold Glen, Mountain View, Clear Lake View, Plum Hollow, Crow Lake, Farmers' Pride, Myer's, Salem, Dominion. Clover Hill, Home Factory, Lyndhurst, Gold Medal, Mapleton, Lake Opinicon, Green's.

FACTORIES IN MR. VILLENEUVE'S GROUP.

Sunny Side, Levesque No. 2, Cambridge, Grassland, Casselman, Riceville, Farmer's Joy, Aurora, Ettyville, Diamond, Midnight Sun No. 4, E. W. 27, Levesque, Russell No. 1, W. S., G. 124, Mayerville, Nation River, Pendleton, South Indian, St. Albert, E. W. 29, A. 46, C. P. Brisson No. 1, L. No. 1, St. Onge, St. Adrien, J. D. 8, G. 557, J. B. No. 1, Cambridge No. 5, R. No. 1, L M G. No. 5, R. No. 2, B. B. No. 1, Midnight Sun No. 1, St. Isidore, J. D. 9, Boundary, Russell No. 2.

FACTORIES IN MR. ZUFELT'S GROUP.

Daisy, Ault's No. 1, Ault's No. 5, C. W. No. 3, Levesque, C. W. No. 2, Berwick No. 2, Fraser No. 1, White Globe No. 2, King, Dundas Star, Ault's No. 2, McLean's No. 3, Smith's Hill, White Globe No. 1, Lorraine No. 1, Central Co-operative, Fairbank, White Globe No. 4, No. 854, W. P., Ault's No. 3, Lorraine No. 2, Ellis No. 1, White Clover No. 5, R. B. No. 1, W. 15, Riverside, E. W. 7, Chesterville, No. 534, Ault's No. 4, M. U. F. No. 1, Ellis No. 2, C. W. No. 1, Berwick No. 1, E. W. 8, M. P F., E. W. 9, Crysler.

FACTORIES IN MR. BURO'S GROUP.

Farran's Point, Farmer's Lee, McDonald's Fancy, Lake View, Glendale, McGillivray's Bridge, Cornwall Gems, May's Fancy, Royal, Wales, Sweet Brier, Lilly White, St. Andrew's, Black River, Star No. 1, Glen Donald, McMillan's Corners, Glencoe, North Branch, Moulinette, Glen Walter, White Rose, River Bank, Cornwall Creamery, Farmer's Pride, Aultsville, Martintown, Glen, Burnbrae, Farmer's Choice, Glengarry Creams, Silver Lily, King's Road, Lunenburg, Island, River Rasin.

FACTORIES IN C. B. LARRY'S GROUP.

Gallingertown, Grantley, Roxborough, McLean's No. 5, Echo, Elm St., Golden Tips No. 1, Apple Hill Pride, Avonmore, McLean's No. 4, McLean's No. 2, Duff's Corners, St. Elmo, Farmer's Joy, Goldfield No. 5, Bloomington, Clover Side, Golden Tips No. 2, Maple Hurst, Brookdale, Sunrise No. 2, Dominionville, Guell's Farmer's Joy, North Valley, Canadian Produce, Finch, Boundary, Goldfield, Strathmore, Sunlight, Sunrise No. 3, Sunrise No. 1, Dixon's, Golden Tips, Newington, McMillan's Corners.

FACTORIES IN W. G. GARDINER'S GROUP.

Limebank, Keystone, Fallowfield, Oxford Mills, North Rideau, Bishop's Mills, Kemptville, Belmeade, Malakoff, Olive Dale, South Gower, E. and W. No. 17, Merivale, Jockvale, E. and W. No. 1, Green Valley, Farmer's Union, Inkerman, Gray's Model, Gordon Model, Scott's, Maple Grove No. 1, Advance, Frame's No. 2, Richmond, Manotick, Kemptville No. 2, North Gower, Patterson's Corners, Mountain, Hallville, Reid's Mills, Carsonby, Miller Corners, Richmond, Kidd's No. 2, Goodwood, Evertt's No. 1, Frame's No. 1, Burritt's Rapids, Oxford Station, Suffell, White Globe No. 3, Rockdale No. 1, Taylor's Daisy, Taylor's, Minto.

FACTORIES IN W. G. GRAHAM'S GROUP.

Cedar Grove, Kirk Hill No. 3, Minto No. 4, Lochinvar, Spring Grove No. 3, Burtalbin, Farmers' Fancy No. 1, C. P. R., Spring Grove No. 2, Ash Grove No. 2, Spring Grove No. 6, Kirk Hill, Maple Row, Beaver Creek, Minto No. 5, Maple Leaf No. 39, Spring Creek No. 1, Burtalbin No. 4, Fournier, Beaver Cricket, Maple Leaf, Spring Grove, Home Factory No. 6, Kirk Hill No. 4, Glen Andrew, Spring Grove No. 4, Ash Grove No. 1, Aberdeen, Aberdeen No. 1, Glensanfield, Stardale, G. T. No. 1, Green, Spring Grove No. 1, Kirk Hill No. 1, Canadian Beaver, Minto No. 3, Ash Grove No. 3, Bush Grove No. 1, Minto No. 4, Farmers' Fancy No. 2, Spring Grove No. 7, Laggan No. 1, Riverview, Spring Grove No. 5, Kirk Hill No. 2

FACTORIES IN A. H. WILSON'S GROUP.

Union Valley, Leeds Union, Miller's No. 2, Farmers' Choice, Maple Grange, Minto, River View, Miller's No. 1, Shanley, South Branch, New Model, Charleyville, Meech, Stanley, Barlow's, Roebuck, Oak Leaf, Willow, Farmersville, Grenville, Hyndman, Park Street, Glen Mail, Lilly Springs, Fairfield, Star, Palace, Algonquin, Garreton, Maitland Union, Glen Buell, Cedar Grove, Groveton, Mainsville, Pittston, Glenmore, Glen Moore, North Star, Glen Elbe, Greenbush, North Augusta, Lee Hill, Royal Dominion, Domville, Langstaff No. 1, Crystal Rock, Cardinal, Ireland, Eclipse.

FACTORIES IN MR. DOOL'S GROUP.

Starlight, Navan, Gilt Edge, Golden Globe, Millbrook No. 2, Russell Road, Blue Bell, Metcalfe, Leitrim, Kenmore, Windsor Star, Greenwood No. 1, Spring Hill No. 1, Leonard, Russell No. 14, Eastman's Springs, Edwards, North Branch, Maple Leaf A, McGregor Star, Vars, Spring Hill No. 2, Sarsfield, Century, Alpine, Banner, Osgoode Centre, Cold Springs, Hillside, Morning Star, White Star No. 1, Milbrook No. 1, Hawthorn No. 1, Alpine No. 2, North Osgoode, Greenly, Sunrise.

MR. AYER: How do you account for the fact that some factories showed openness and others did not when the cheese were shipped in the same car?

MR. PUBLOW: When cheese are open simply from being sprung by the heat it is of a different character to that which is due to the manufacture.

MR. AYER: Why do some cheese show openness from the same factory, and others not?

Mr. PUBLOW: That is from different vats of cheese. When shipped at a high temperature it takes a certain time for it to take effect; in other words, some cheese are not as perfect as others.

Mr. AYER: I want that fact brought out, because some cheese do show openness and others do not.

A MEMBER: Would not it be a good thing if the patrons delivered their own milk at the factories?

Mr. PUBLOW: Fifty per cent. of the patrons deliver their own milk to the factory, yet we have the greatest proportion of poor cheese come from the east of this section. That is not because the milk is not of better quality, because the great majority of cases are in fairly good condition, but it is due to the small and poorly equipped factories with incompetent men in charge, and the curse of Eastern Ontario that we have to deal with is due to the lack of ability of the men who have charge of these factories. If you will take this report and see what number of men are actually well qualified it will astonish you.

SOME POINTS REGARDING BACTERIA IN RELATION TO DAIRYING.

BY WM. CONNELL, M.D., QUEEN'S UNIVERSITY, KINGSTON.

For a number of years I have had an opportunity before the annual meetings of the Eastern Ontario Dairymen's Association of addressing its members on "Bacteriology in Relation to Dairying," and as the meetings are held in different localities I can use the same text again, and, only those who follow the meetings each year will recognize the text and the sermon, and frequent repetition will not injure them.

In the minds of most people, when one speaks of bacteria, germs or microbes, there is conjured up a vision of horrible creatures with legs innumerable, whose effects are destructive or even deadly. Let me say that in reality they are very simple looking objects when seen under a microscope, in fact so small, simple, and harmless looking that one seeing them is very apt to say what good or harm could such insignificant objects possibly effect? The individual germs consist of a single celled plant, microscopic in size, and indeed visible only with a powerful microscope. But by the massing together of large numbers of these cells we can get masses visible to the eye, or their presence is made manifest by various changes which they are able to effect in the material in or on which they are developing. Nearly three thousand different species of bacteria have been described, and have been found to be effective agents in the production of many processes, most of which are highly advantageous to man, or to soil or water, etc. On the other hand, they have been found to be active in many processes which we ordinarily look upon as destructive and dangerous, or at least highly undesirable. When we come to consider some of these processes in which bacteria are active, we can readily understand how it is that there are some which we look upon as highly desirable forms and others which we must place in the opposite category.

With most people, to speak of bacteria is to bring up the spectre of disease, for we now know that most of the common infectious diseases of animals and man are of bacterial origin, and even such conditions as boils and abscesses, colds and sore throats, appendicitis, and gall stones are of like origin. Now, all will agree that the disease producing or pathogenic bacteria are highly undesirable, and that there is necessity for people to take all precautions to check their development and limit their spread in the interests of public health.

Another large group of bacteria are engaged in the processes of decomposition, decay, or putrefaction. When an animal dies its tissues, unless preserved by chemicals or by cold or by drying, begin to decay, to putrefy. This is due to the entrance and growth of bacteria which bring about marked destructive alterations in the tissues. The actual disintegration of such a body is materially assisted by bugs, beetles, and worms, yet the main destructive changes are due to bacteria. In the same manner a tree falls and gradually decays, the decay being due to bacteria and moulds assisted again by beetles and worms. It is a process in which organized material (matter of complex structure) is reduced again to simple elements which pass off into the air as gases or into the soil as dust and ashes. These simple elements—the gases, dust and ashes—are now in a position to form fresh combinations, to enter again into the structure of plants and trees, of animals and man. It is Nature's method of keeping the working material of the universe in circulation. It will be hardly necessary for me to say that the putrefaction of meat, the rotting of eggs, and certain decomposition changes in milk, butter, and cheese are due to these putrefactive bacteria, so that while it is a natural enough process it is one which is not necessarily a desirable one to man, or rather to the individual who is affected thereby.

Another process, of vast importance to agriculture, due to bacteria in great part, is the process known as nitrification, which goes on in the soil on in some waters and most manures. Into the structure of the cell constituents of plants and trees nitrogen enters so that a supply of this in available for is requisite for the nourishment and growth of plants. There is an abundance of nitrogen in the air (over 78 per cent. of the air consisting of this gas) but such nitrogen is not available for plant nourishment. Now certain soil bacteria known as nitrifying bacteria have the property of causing the inert nitrogen of the air to enter into combination with other elements forming nitrates ("nitre") which combination is now available as plant food. Without this process most soils would rapidly become sterile. Attempts are now being made, with only fair success so far, to inoculate land with cultures of these nitrifying germs. It will require much work and experimentation yet to get this important matter on a good working basis.

Another important group of bacteria are active in many processes classed in fermentations. This is in reality a peculiar type of decomposition whereby simpler bodies (chemically speaking) are produced from these of somewhat more complex structure. Among the fermentations one commonly sees in the fermentation of solutions containing sugar into alcohol, as in the making of beer and wine; the further fermentation which such alcoholic solutions may undergo in their transformation into acetic acid (vinegar) is also a well known process. Another very common process is the "raising" of bread by use of yeast. In butter, and especially in cheesemaking, the entire process is practically one of control of fermentation. Souring and curdling of milk, the ripening of cream, and acid production in cheesemaking may be instanced as common examples. Of course all the fermentations in cheesemaking are not of bacterial origin, as the curdling is due to the rennet ferment added, and the ripening of the cheese is also due mainly to the digestive ferments added in the rennet.

Considering now the bacteria in milk, let me first state that while the milk in the udder of healthy cows is free from bacteria that it is not possible by the ordinary methods of milking to secure milk that is free from these germs. Why? Because it has been shown that many germs can and do thrive about the lower ends of the cows' teats just within the opening as well as on the surface of the teat, and these almost of necessity will be washed into the milk. Many more will come from hairs and stable dust, particles of manure and straw, from pails or milk vessels not thoroughly sterilized, and from like sources. But while by ordinary methods of milking milk cannot be secured free from bacteria, yet there is a direct relationship between the numbers of bacteria so found and the cleanliness exercised in milking. It has been shown many times that the greater the care and cleanliness exercised in securing milk the fewer bacteria there will be present, and as a rule there will be less chance of undesirable forms of bacteria being present. The difference is frequently very marked even in the same herd under different conditions of care and cleanliness, being in proportion of from 1 to 6 up to 1 to 30 between careful and slovenly methods. Now the effects which the bacteria which have been introduced will bring about will depend, first, upon the character of the germs introduced, and secondly, upon the opportunities afforded them to develop. A number of the bacteria which get into milk do not thrive well and are not able to bring about any special changes in it. These may be at once dismissed from consideration. One great group of bacteria which in the vast majority of cases will be found present is the group of acid-producing bacteria leading to souring and curdling of milk if they are allowed to develop long enough. This is a fairly large bacterial group containing a number of very well known species and others less often met with. In this acid-producing group are found the desirable species of bacteria requisite for butter and cheesemaking, but also some highly undesirable species. The desirable forms of the acid-producing group are those which produce lactic acid without by-products such as gases and other undesirable decomposition products. The great type of this species is the bacterium so prevalent in Eastern Ontario and which is known as the Lactic Acid bacillus (Esten). This bacterium when introduced into milk and allowed to develop produces a clean flavored souring without gas and the whey which separates out from curd is watery. This is the only desirable bacterium for butter and cheesemaking, and in good cheese it is found that over 99 per cent. of the bacteria present belongs to this species. This bacterium finds its normal place of development in milk, and flourishes in great abundance in milk and its products; hence it is seldom absent from dairies or factories. But there are also some bacteria which produce more or less acid and yet are undesirable. These are the bacteria which when introduced into milk, sour it; but the curd is torn with gas holes, or gives off a bad flavor and the whey which separates is somewhat milky. Or if present, and the usual fermentation test is carried out, gas formation and bad flavor become much more marked. In smaller or larger numbers these bacteria are found in the milk brought to most factories. They come particularly from manure and stable dust, but they readily habituate themselves to milk and are the most important causes of trouble therein. With some species, to a certain extent, the acidity developed by their growth checks their deleterious action; but with some other forms their undesirable features continue to be marked even with the development of considerable acidity. When these bacteria gain the upper hand in cheesemaking we always have an inferior article more or less tainted, varying from a "not clean" flavor through the various grades of "off" flavor to a distinct rank rancid article. Some of these bacteria may kill out the desirable acid formed about a factory, and its tributary dairies, and may lead to very serious results not readily eradicable. Such cases require at the factory a supply of "starter" of the desirable acid-producing type, thorough cleansing of all factory vats and whey tanks, and at the farms require extra care in washing and scalding of cans and pails, extra care in milking, and also thorough cooling of the milk. For bacteria require for growth only a suitable food material like milk, but the temperature conditions must be favorable. By cooling the milk, bacterial development is largely checked, and if low enough entirely prevented, so that cooling of milk ranks equal with cleanliness of milking in the production of a first-class article of milk at the factory doors. Milk in the summer season should be cooled to 65 F. at least, as rapidly as possible after milking.

But besides the acid-producing bacteria, other forms occasionally gain entry to milk. Of these the slime producing or sweet curdling bacteria are seen not uncommonly. These bacteria either make the milk slimy and stringy or else curdle it without its becoming sour. This condition may be met with either in summer or winter and may be brought by several different bacterial forms. Some of these act by producing a ferment like rennet, while others act by their having about them a glue-like covering, and by these coverings sticking together, the milk rapidly becomes filled with a stringy mass. I had a number of examples of this kind of milk sent me for examination last summer. One was particularly interesting as it was in the milk of a large dairyman supplying milk in Kingston. This man's milk for several weeks was quite stringy when allowed to stand over night at a temporature of 70 degrees F. or over. He was a careful man and took very good care of his milk, and made an extra effort to get rid of the trouble, but at first without much sucess. Later, on examining the milk of each cow separately, it was found that one cow's milk almost invariably became slimy on standing. No special cause could be assigned for this as udder was healthy and the other conditions the same as for rest of herd. It was evident that the germ had habituated itself to grow in the lower ends of teats of this cow and on rejection of her milk the condition cleared up. This is not the usual source of this trouble, however, as it is more apt to come from bacteria found in hay dust and from the scum of stagnant, grassy pools;—the former blowing into milk cans and pails, the latter dropping when dried from udders, sides and tails of cows during milking

Other types of germ infection of milk are at times met with, but I will not dicuss them here. I may mention such as yeast infection and rust spots.

During the past year I have again had opportunities to see most of the usual types of "taint" or "defect" in cheese, and in a number of instances have had the opportunity, along with Mr. Publow, of making a personal investigation of the local conditions.

One factory visited by us had marked "rusty spot" cheese. To the casual observer the factory and utensils were clean, but on careful examination of strainer racks, mill, floors, and gutters a different tale was told. On the floors (cement) and gutters particularly, little rusty points were not difficult to detect, and these points were largely made up of the rusty spot bacillus. In this factory, too, there had been some yeasty open cheese, and a yeast corresponding to usual type of yeast met with in this condition was isolated from strainer rack, gutter and whey tank, so that the one investigation disclosed the fact that this factory was quite capable of seeding itself, and also, through the whey, of infecting all milk put into cans which were not thoroughly cleaned. While on this point I may say that the ordinary cleaning given milk cans never frees them from bacteria and yeasts, and if these are present in the whey they will come back in the milk in at least two-thirds of the cans, and very frequently will return some five, some twenty, and some a hundred fold.

At another factory the cheese were decidedly "off flavor," or as Mr. Publow more emphatically termed it, were "Stinkers." Here, on applying the fermentation test to a number of samples of patrons' milk, it was very evident that several were seeding the factory with a choice lot of the usual type of bacteria found in such conditions (*B. lactis ærogenes*). But there were conditions about this factory itself which were not of the best. Thus the water used for cleansing purposes came from a nearby creek. From this a short way up cattle drank and the shores were swampy. This water at the time of our visit smelt of the cow stable, and showed many floating vegetable and animal particles. Bacteriological examination showed the presence of bacteria characteristic of manure in this water, including numerous bacteria of forms mentioned above, as well as an abundance of these bacteria found in water with much vegetable organic matter. This water was certainly not fit for use even after boiling.

Too many of our factories have a poor water supply. I know that two-thirds of the factory water sent me for examination is unfit for use, that is, contains bacteria which are directly harmful to butter or cheese, or indeed which which make the water as dirty as the substance supposed to be cleaned by it. Of course, it is probable that only the suspicious samples are sent me, and that those not under suspicion would no doubt be better. Granting this, yet from my experience in the examination of well waters from both rural districts and towns, it is almost certain that one-third of them would not pass a proper sanitary inspection and examination. Of course the matter of factory water supply is very intimately bound up with that of factory drainage, for it is from the waste matter about factories that the wells are most frequently infected. To the credit of our factories be it said that drainage conditions are rapidly improving, and no doubt in a few years all recollection will disappear of the fact that a cheese factory was as soon appreciable to the nose as to the eye. The questions of water supply at farms and factories, and of factory drainage, are ones the importance of which I cannot too strongly urge upon our sanitary inspectors, factory owners, and patrons.

Just let me in closing shortly summarize some points in connection with bacteria in dairying.

1st. Bacteria are invariably present in milk and the development of certain species therein is necessary for the production of essential or desirable fermentations in butter and cheesemaking, consisting in the former (butter) of the ripening process and in the latter (cheese) to acid development.

2nd. Bacteria of desirable character are widespread and are almost certain to be present under normal, natural conditions.

3rd. It is essential that bacteria of undesirable character, *i.e.*, those capable of inciting taints or defects in milk or its products, should be excluded.

4th. Bacteria of undesirable character are nearly always derived from sources the reverse of cleanly—from manure and manurial dust, from bad water, from improperly cleansed pails and cans, etc.; hence to avoid these it is essential that *care and cleanliness* be exercised in milking, handling, and storing milk.

5th. For bacterial development to occur, besides suitable food, the temperature conditions must be favorable, and practically we find that for most bacteria developing in milk, the temperature becomes more favorable the more nearly it approaches the temperature of our bodies, 98 to 100 degrees F.; hence to prevent such bacterial development it is essential during the warmer months to cool milk below the point of rapid development, *i.e.*, down to or below 65 degrees F.

6th. While such temperatures also prevent the rapid development of the normal acid-forming bacteria, yet it interferes with these less than with most of the undesirable bacteria in the period during which milk is usually kept for cheese factory use.

7th. It is as possible to infect milk during manufacture with undesirable forms of bacteria as it is at the farm; hence it is as essential that care be taken in handling the milk at the factory, and that everything which comes in contact with the same during manufacture be as clean as possible.

REVIEWING THE DAIRY SITUATION.

By J. A. Ruddick, Dairy Commissioner, Ottawa.

I fear that what I have to say in leading the discussion on previous papers has been diverted into other channels by Dr. Connell's most valuable paper on Bacteriology. I am, however, very glad indeed to take part in this discussion this morning, and particularly glad to do so in the town of Picton. There are some special reasons why I have pleasure in meeting dairymen in this district. I do not know any other part of Canada where the suggestions I have made in connection with my work have been so well received and adopted as they have in this part of the country, and I am glad to find you are still of the same mind. Mr. Publow referred to the fact that nearly half the cool-curing rooms in eastern Ontario were located in this county. I do not think you are making any mistake in that connection. I have had opportunities of studying the importance of the cool-curing of cheese, not excelled by any other man, and the more I know of it, the more convinced I feel that it is only a question of time until every factory in this country must be equipped in this way.

I listened with very much pleasure, and I am sure you all did, to the remarks made by Mr. Barr; and I think you will all agree with me when I say that I feel like congratulating myself that I have such a very capable assistant in carrying on my work.

Mr. Barr has been referred to as the official referee. That is not Mr. Barr's permanent work. He is capable and able to serve the country in much more important ways; not but that the work of an official referee is important, but I think a man qualified to do that can be found, and Mr. Barr can do other work which will be of much greater importance.

Mr. Barr covered his ground so well that it does not need discussion. He states it is the duty of the salesman to acquaint himself with certain conditions in Montreal. I would like to emphasize that point. We heard a great deal about the trouble in selling cheese in some districts. I believe one of the things that gives rise to the trouble is because there are too many men managing factories and selling cheese, who know absolutely nothing about the business. There is no other business under the sun that could be prosperous under such conditions. I want to say that I have watched this thing a great deal, and I think it is something that should be remedied. We must put some business methods into the handling of our cheese, and if we did the difficulty would disappear. Advantage is taken of the man who is ignorant of his end of the business, and that is where a great deal of the trouble arises. I think I can go further than that, and say that if I was a milk producer I would feel inclined to insist that the man who manages the factory where my milk went would make it his business to study some of the things which he would handle in conducting the business.

I do not mean to include all salesmen under that head, because I know there are many successful men who are not having any difficulty. I would like, also, to support Mr. Barr's suggestions about the marking of cheese and boxes. We sent out circulars from my office in Ottawa to as many factories as we had the addresses of. The factories in western Ontario have been doing that as long as I can remember, and I have been connected with the cheese industry up there for nearly thirty-five years. They do not mark the boxes because the cheese are inspected in the factory.

I am sure I need not pass any compliment to Mr. Publow, who is so well known to the dairymen of eastern Ontario, and very much farther afield than that. Mr. Publow is always a welcome speaker at any of these gatherings, and always gives us something of value. I was glad to hear him dwell on the importance of this matter of sanitation, and he told us that there is great improvement in that connection throughout the district over which he has supervision. There is a great awakening all over the civilized countries in connection with matters of this kind. The work which men like Dr. Connell have been doing the last few years has had a great deal to do with bringing about improvement in this connection and arousing the people to the importance of more care and greater attention to sanitary conditions surrounding the preparation of food products. We must handle these things as quietly as possible.

Mr. Publow referred to the question of making whey butter. I have had a great deal of correspondence with factorymen from the Province of Quebec with regard to this matter, and my advice has been to go slow until they known more about it. Making whey butter is not new. One of the first things I can remember in connection with cheesemaking was the making of whey butter, but we only skimmed the cream off the fat and used the butter to grease the top of the cheese. Whey butter was made in many of the factories fifteen or sixteen years ago, and for some reason or other the whole thing was dropped, and it never made any very great progress. I mention this because I think there has been a wrong impression in the minds of many that it was some new discovery in the dairy business. It was practised in Ontario, even up at Deseronto, fifteen years ago.

Some slight reference was made to the question of shipping green cheese. I think most of you know that I took a pretty strong stand on that point last spring. The Picton cheese buyers were among the first to take up the question, and they passed a resolution in favor of holding cheese in the factory a reasonable length of time. (Applause.) I had occasion last summer to look into that question while in England, and I had a great many object lessons. If these cheese are put before the consumer before they are fit to eat it will have a bad effect on the consumption of Canadian cheese. And I hope the dairymen will give the matter full consideration.

While in England last summer I had an opportunity of visiting the home of Cheddar cheese in the County of Somerset. The name of Cheddar originated in that county. I got a man who was thoroughly acquainted with the county, and engaged an automobile, and we covered nearly 200 miles in one day, and we visited the Dairy Show in Shipton Mallet. There were over 1.000 cheese on exhibition, and I visited the dairy where the proprietor always gets 18 cents a pound for his cheese. They were just Cheddar cheese, the same type that you make here. They are made on what is known as the quick ripening method. That does not imply as much as it would here because these cheese are all left in the curing-room ten weeks before shipping. This man believes the proper temperature for curing is 60 degrees, and I found that universal throughout the county of Somerset.

There is just one point in connection with the production of milk which I think is worthy of note, and I think it bears out what Dr. Connell has told you. In Somerset the cows are all milked in the pasture field. In other parts of Great Britain they milk in the stables, and in Scotland they milk in the stables, but in the County of Somerset they milk in the pasture. They do not have any set milking places; they are milked here and there about the pasture so that there is no collection of dust and filth. There is less danger of contamination. They do that purposely to prevent the collection of dust. Sometimes where the cows are milked in the same place all the time it is a great source of infection to the milk. Another point I would like to make is, that we naturally like to know the difference between cheese that would bring 18 cents a pound and the average character of Canadian cheese. As near as I could make out it is something like this. These cheese are well made, very rich and meaty, the great value of this cheese lies in the flavor. I think we make a mistake in this country, and that we set up a rather wrong standard with regard to the question of the flavor of cheese. It is probably due to the fact that most of our cheese go out before they develop the characteristic cheesy flavor. We are satisfied with our cheese if they have the absence of bad flavor. I want to point out to you that cheese having no more positive quality than that would not bring 18 cents a pound in Somerset. In addition to that absence of undesirable flavor, the cheese must have the real positive cheesy flavor, and the higher that is developed the more the cheese is worth and that difference will make people over there pay 6 cents a pound extra for it. We cannot have this high cheesy flavor, this rich nutty flavor, in cheese if we cure our cheese at a temperature of 80 or 90 degrees, and allow them to be exposed at a high temperature. Cheese must be kept uniform at a temperature of 60 or 65 degrees; I think 60 degrees is the very much safer temperature. These cheese that I speak of are never allowed to get warm. Some reference was made by Dr. Connell to the cooling of milk. All I have to say on that point is that I have recently published a bulletin as to the use of ice on the farm, giving ample directions as to the putting up of ice with some plans of making combined ice house and milk stand. I believe the first one of these was built in this county.

I want to make one reference to the shipping of cheese from this district. Last year it was brought to my attention that there was a possibility of having ice cars on the Central Ontario Railway, and we are quite willing to make necessary arrangements with the railway to supply these cars, and to pay $5 per car for icing for a limited number of cars per week. The cars are supplied by the railway company on the demand of the shipper. We have nothing to do with the supplying of cars. There seems to be some difficulty in making satisfactory arrangements for shipping cheese from Picton by railway. I have been approached to make some similar arrangements on the boats. I have an appointment to meet the Cheese Board and the shipping company this afternoon, and I hope we will be able to make some similar arrangement as was made on some of the lower St. Lawrence boats. I think it would be a great thing. (Applause.)

There are difficulties in the way of this river boat refrigeration, and there is a difficulty in the running of a steamer carrying unoccupied space. It is quite a difficult thing to provide cars which are not run unless there is something for them to carry. The steamer must go, and it is hardly fair that we would have space entirely vacant. I hope we will be able to make some satisfactory arrangement. I realize that the cheese whether coolcured or not, should be carried at as low a temperature as possible—at least 60 degrees. I do not agree with the statement that a ventilated space on a river boat is as good as an iced car, because the temperature is not low enough; ventilation will not produce a temperature below the outside air, and the outside air on the St. Lawrence is very often 85 degrees. A box car closed up will, of course, become hotter than the outside air, and a refrigerator car without ice will be hotter than an ordinary box car. We want the temperature down to 60 degrees, and I believe the time will come when no person will think of shipping cheese unless they have some provision of that kind. (Applause.)

The Government does not undertake to supply all the cars that are required. I think it amounts to 120 or 150 cars a week over the different lines. It is a question of first come first served, and the wide-awake shippers are getting rather more cars than the others, because, they take hold of the question and place their cars and get them. I want to make it clear that the Department has nothing to do at all with the supplying of the cars. We simply induce the railway companies to put on these cars by paying $5 for the icing. If it costs more than that somebody else has to pay. The service begins usually about the first of July.

Mr. John McGregor: I think the first of July is a little late. The weakest cheese we have in the season is made from the first grass. I think if you change the date from the first of July to about the 15th of June you would be doing the country a good service.

Senator Derbyshire: Never mind the date; give us cars when the weather is hot.

Mr. Ruddick: We have to make definite arrangements with the railway companies, and we cannot tell whether the weather is going to be hot next week or the following week; it is a question of doing as much as we possibly can. We find that by taking this service ten weeks, we are doing the greatest good to the greatest number of people. You are more likely to require iced cars during July and August and the first part of September than you are in the month of June. If I were shipping cheese, I would have an iced car if I had to pay the $5 out of my own pocket. You have to order ice cars a day or two ahead. They can only be iced at certain places, and refrigerator cars are limited in number.

The object of the Government in providing these cars was not to save somebody $5 on a car; it was simply to educate the dairymen of this country to the importance of shipping cheese in iced cars. You did not hear anything about shipping cheese in iced cars ten years ago, but now, through this object lesson, you have begun to discuss these matters. I am very glad to see that you criticize and ask for these things, for it shows that you are taking an interest and realizing the importance of this question.

HOW TO INCREASE OUR OUTPUT OF MILK.

By J. H. Grisdale, Agriculturist, Experimental Farm, Ottawa.

I have attended many of the conventions of both the Eastern and Western Dairyman's Associations in Ontario, and I must confess that I see before me to-day by far the largest representative audience I have ever addressed. I must congratulate you farmers of Prince Edward upon the interest you are taking in dairy matters, and the good way in which you exemplify your interest by coming out to learn a great deal that may be of use to you. The importance of the dairy industry in this country grows daily; the output is increased year by year, and the quality has improved. The quality has improved, I have no doubt, largely on account of the efforts of this and similar associations to make improvement by indicating to the inspectors and makers what is required, and by inspiring them with renewed efforts to carry on their work better, so as to produce an article which will command a higher price than has been paid heretofore.

The farmers of this country, have another side of this question to consider, and that is, the increasing of the output. That is a question that sometimes frightens us a little bit. I have heard it said that if we materially increase the output, the price will be lowered, and the prices will not be so good. I believe that is not the case. If we can increase the output, and if these cheesemakers, inspectors, and buyers do their duty, we can command just as high a price if our make were doubled.

The question I want to take up with you to-day is to consider what steps we can take and what plans we should follow as farmers in this Province, to increase our output of milk, as you know on this rather materially depends the cheese output. We might be considered a milk producing rather than a grain growing country; still there are some who have not found it convenient or possible or advisable to change, and those who have changed are still retaining many relics of grain growing.

When producing rough fodder was the general business of the farmer, feeding profitably was a matter of very minor consideration. As an example of the relics of growing cheap fodder let me cite the great number of fields which we have on our farms. In olden days we thought it was a great advantage to have a number of fields; in fact, when we were cleaning up our farms we managed to get 10 acres or so cleared, and we would fence up that much, and when we rounded up with 100 acre farm cleared, we found ourselves with anywhere from 10 to 20 fields, of varying size and varying conditions. Now many of us have changed this, and we should have fewer fields. We attempted to grow certain crops at irregular intervals in certain fields, or in a certain area of the farm, because we are apt to think they are in a nice position, well located, and convenient for hauling out manure, etc.

Another point. As farmers we are apt to neglect our cows. We are apt to think, "Well, they are only cows, and we have got to get this harvesting done, and these roots off, and this plowing done, and we will look after the cows the best way we can." That is a relic of the old times. If the cows come at night to be milked they would be milked, and if they didn't they would be milked in the morning.

In many parts of the Province there are remnants of that old doctrine of taking the cows when you can get them; work away till nine o'clock, and then rush in and milk the cows. If we would succeed as a dairying country we must get rid of these old relics. What steps shall we take to get rid of it, or how are we going to succeed to make ourselves into a first-class dairy farming country?

In the first place we must consider the cattle, and their care, and secondly, the way to provide for these cattle, independent of comfortable quarters in winter and summer. Take conditions in the summer: First, we must have ample food, and you may get that in various ways. You may have a large area of rough pasture or poor pasture and expect your cows to wander around all day looking for feed, with the temperature, it may be, around 90° or 100°, or storms raging, still you expect them to get around and hunt for that feed. That is not the best way. We should arrange to provide food for the cattle in ample quantities and conveniently, and be able to give it to the cattle so that they will be able to consume it in comfort; and that means better pasture, better arranged farms, ample provision for supplementing this pasture if and by any accident the pasture seems to fall short. We must have good fodder. If we give them nothing but clover in the middle of June, we will find that they will fall off a little. We must make arrangements to have properly balanced rations right through the season. We must not expect them to do well if we compel them to roam through the fields in the hot sun.

In the winter, we must have, in the first place, something appetizing—something that will tempt the cattle to consume large quantities of food. The aim of every feeder should be to compel his cattle to eat a large quantity of food, not the most expensive feeds, but foods of the right kind. It must be satisfying. It is not enough to give them wheat straw, and expect them to thrive on that; we must give them something of high feed value, not necessarily oil meal or gluten, or cotton seed meal, but something in addition to the filler. The primary consideration must be economy of production—the cheapness of the food. If we are going to lower the cost of production, we must produce feeds that will be produced at the lowest price, and these feeds must be wholesome. Most of the feeds, I am happy to say, are of that kind. I am not talking of winter dairying on the present occasion, but rather of the dairying as carried on by the average farmer of this country; and to have this done as nearly ideal as possible something must be done in the arrangement of the work on the farm in the system of farm cropping, and farm cultivation.

In farming more than in any other industry it is essential that system prevails. If a farmer operates his farm without a definite plan as to how the operations are going to be carried on, he will not make that success that he should; he will not reap the rich reward which would have been his had he with the same energy and same ability put things under a systematic arrangement and carried on the work in an efficient and profitable manner.

Very recently I had this important point strongly exemplified. We are, more or less, at the mercy of climatic and soil conditions, but we can very largely control these if we are willing to adopt a system and stay with it, and this system is what I want to talk about to-day. Of course, the man who has some rough land must naturally leave that part of his farm to pasture. Those of you who have considerable rough land will find it will be valuable for your young stock and dry cows, but that part of the farm that is arable should be considered as a whole, and then divided into parts, upon which part should be followed some regular system of rotation.

In the first place, the arable portion of the farm should be divided into two parts, which might be set aside, one for winter and pasturing, and the other for summer feeding. From my observations I think that each farmer having 100 acres should set aside from 12 to 15 acres upon which to grow what might be known as soiling crops for the feed of his cattle during the summer provided he requires it, and has not sufficient pasture. If he does not happen to require it in any given year, the crops are there for consumption in the fall or winter or early in the spring. This area of 12 or 15 acres should be divided into three equal fields. Supposing we have 15 acres, that would give us three 5 acre fields. These fields should be carefully selected, in my opinion, and I am speaking according to experiments I have conducted. They should be selected adjacent to the buildings or as convenient to the buildings as it is possible to get them, and upon these fields should be grown three different crops. First, clover upon one 5 acre field, then peas and oats upon another 5 acre field, and corn upon the third. This corn should be part of an early maturing variety and part of a later maturing variety. The clover, of course, will be all ready about the same time, but we can start to cut it early and continue cutting till late. Peas and oats, or whatever grain you select should be sown at different intervals, ten days or two weeks apart. Sow a half acre or two acres as the case may be. The next year, on the field where clover was grown, I would sow corn. Manure the clover during the winter, plow down in the spring, and sow corn of the same variety as the year before. Where the peas and oats and vetches are sown, there should have been clover sown with them. Upon each field we follow a three year rotation, so that in three years we have first, clover; second, corn; third, peas and oats or oats and vetches, or something similar; fourth, clover, fifth, corn; and the sixth peas and oats and vetches and so on *ad infinitum.* It will require comparatively little manure, and you may anticipate continual and rapid improvement in the soil. The only danger I have experienced is that sometimes the crops of oats and vetches are too heavy, and it is hard to get them cut in time to prevent them smothering the clover. All this could be done if they are sown at proper intervals. To sow the whole thing at once, and then to get it off as best you can, is to insure failure, but to sow at intervals is to ensure success.

These three fields of 5 acres each being picked out, we should have in addition, some small areas for pasture, where we can feed this stuff to some cows or calves.

The balance of the farm should be divided into four equal fields, and on them you should follow a four year rotation.

Now, you will say, my farm contains five or ten fields, and I am not going to take out the fences and ditches and level things up. That is not necessary. You should merely arrange your fields in whole or in part, and have the same rotation in one or more fields. It is not necessary that a quarter of the area be in one field; it might contain two or three fields; but follow the four year rotation.

In this four year rotation you would have one field for pasture, one field for hay, one field for grain, and one field for corn, roots and potatoes, and if you do not think you want to sow such a large area as 20 acres for corn potatoes and roots, you might have a little bit of mixed crop to be cut for hay or feeding off. This rotation would give you 20 acres for pasture, and in addition you would have 50 acres whereon you would get green feed which should, I consider, carry you safely through from May to October, when the feed from the rest of the farm would have to come in. On this 80 acre division, or on the four year rotation, you would have a succession of crops. The first year hay or grain; seed down with timothy or clover, pasture in part or whole, if necessary, and if you find that you can spare part of that pasture then you will have some timothy hay; fourth year, corn. This corn land should be plowed in the spring just immediately before sowing the corn. Having been manured during the winter, spread the manure on it as hauled out, and let grass grow up with it until a very few days before the corn is sown. In this way you would have two years of clover, or practically three years, for not unfrequently clover lasts during the third year, or there is enough seed scattered from the first crop to insure some growing up the next year in the pasture. The first year you would have in the rotation three years' clover and one year fallow land with manure. During practically every year something is done to improve that soil. You have in the first year the clover and timothy sown, and our experiments carried out during some ten or fifteen years have shown us that the growth of clover during the first year from ten pounds of seed per acre, is equal to ten tons of barnyard manure applied green, and goes to show that during the first year you have improved that soil by ten tons of barnyard manure.

The second year you have a crop of clover; in fact if the climatic conditions are favorable, you will have two crops. I do not know what conditions exist here, but with us at Ottawa we practically always have two crops of clover, and we always harvest it; we never have to leave it on the ground. If we do not cut it, we pasture it off. But, we find there is a very considerable loss when it is pastured off, unless we put the cattle on early, and then there is a loss in spite of all we can do.

The third year is timothy. There is more or less clover growing, but there is considerable timothy, and after we cut the hay off, and after we pasture it, the loss is very small indeed; in fact, although we take considerable plant food out of the soil by the crops being pastured, the soil improves a great deal.

The fourth year it is corn, and of course you know that after a crop of corn has been properly manured, the land is in better condition than it was before. Now you see what advantage you have. It is very easy to carry out this plan and the results are very remarkable.

A MEMBER: Why do you approve of plowing sod in the spring?

MR. GRISDALE: Because we get an extra growth of green material to turn under, and when it is plowed in the spring we have a large amount of vegetable matter there in addition to the manure to turn down. This immediately begins to ferment, and a lot of this bacteria gets to work in there and warms things up, so that your soil is warmed not only above, but from below. In addition to this, bacteria liberate immense quantities of plant food, and put it into a form in which it is suitable for the plant to grow. Corn is a greedy feeder, and if you will give it lots of warmth and plant food, then you have ideal conditions to make it grow.

I have no objection to fall plowing, provided you have the manure turned in not too deep. For certain crops we want to get a certain amount of roughage; we want to get all the stems and leaves that we can, and to do that we must sow our seed on fields that are rich in humus, rich in nitrates, and rich in the elements which go to make rapid growth. Therefore, we put corn on a field where sod has been plowed down, where there is lots of decayed vegetable matter, lots of food suitable for making the stems and leaves and roots grow. Clover grows best on a field where summer fallowing has been carried on to a certain extent, and where the weeds have been fairly well eradicated. Putting two years to grain together militates against returns, and we have more advantage in cutting the crop.

If instead of sowing corn on the sod we had put grain the results would have been quite different, unless we have followed the plan of plowing in the fall, working up thoroughly and sowing grain next year. Last year we plowed a piece of sod land after August and ridged up in the fall. In the same field we plowed another piece late in the fall, worked it down in the spring and sowed oats uniformly over the whole area, and from that part that had been plowed in the early fall, we cut almost double the crop of oats, and certainly twice as good a cut of clover as we had from the field plowed late in the fall, showing the difficulty that exists in getting a good crop on late plowed land.

Rotation of crops are absolutely necessary, if good crops are to be looked for. I have seen this rotation in operation on one little farm for five years. It has about 80 acres of arable land; it had been an abandoned farm and was sold at a sheriff's sale. The young man bought it for a trifle, and he was able to winter with the material grown on that farm twelve head of cattle and two horses, and last year he wintered thirty head and didn't have to buy any feed, and he also kept four horses. He did that by following this rotation. If we are going to get the best results we must think of the comparative results. I visited a large number of farms in the London district where comparatively no labor is used at all. These farms have been practically abandoned. The young men went west; why, I could never imagine, because there are certainly no better farms out-of-doors. The fathers left the farms and went to the villages, and the farms are rented to people who buy stockers in the spring, and let them have the grass during the summer. I enquired of some of these men, and they told me they pay a rent of $2.50 per acre. In some years they made a little money, and other years they drop money.

I visited another farm where they grew nothing but grain and sold it, and they have made a revenue of from $700 to $900, depending on the season and the prices. The revenue didn't average more than $800 a year. The farmer employed one man all the time, and one man part of the time.

I visited another farm where they kept very few cattle in summer and fed off all that grew on the farm in the winter, and on that 100 acres of land the revenue was about $1,500. He kept two men in the summer and one man in the winter.

On another farm where they kept pure-bred cattle and a few horses, and three men in the winter and summer, the revenue was something like $2,200 to $2,400. On another farm of 100 acres where they kept pure cattle, the revenue from the cattle they could keep on their places and some swine was somewhere around $4,000; one year it was $4,500. That is where they kept three men the year round.

Now, you will see the greater the amount of labor put on the farm, and the better cultivation given to it, the infinitely greater was the return. I have to go to the United States to give another instance, and I find there an example vouched for by a man upon whom I can depend, a representative of the Federal Government. A farmer near Philadelphia took a little farm of 15 acres. Upon that farm he was enabled to grow the first year enough to winter two head of cattle and a horse, and in a number of years he was able to winter thirty head of cattle and two horses, and had hay to sell. He employed a man and a boy. If you figure that up, it comes to about 20 men on 100 acres of land. We Canadians to-day produce somewhere in the neighborhood of $100,000,000 worth of dairy products, and we ought to be producing $200,000,000 and have no difficulty about it. We can get there if we are only willing to combine our energies. (Applause.)

The CHAIRMAN: I am sure we all feel highly honored that we have with us this afternoon Prof. Pearsons, of Cornell University, one of the finest Universities in the United States, who is to address us.

Mr. J. A. RUDDICK: Before Prof. Pearsons speaks I would like to say one word. Since this Association was organized we have had many men representing the dairy industry from the United States to address us. I can remember back in the eighties William Arnold, Mr. Harris, ex-Gov. Hoard, John Gould, Mr. Lewis, and many others, and speakers from this side have occasionally gone to the other side. We have learned a great deal and are very much indebted to our friends from the other side of the line. I am glad that we have with us one who was Chief of the Dairy Division at Washington, and General Manager of the Walker Gordon Laboratory, and who is now the Professor of Dairying at Ithaca. For some years past the Minister of Agriculture has authorized me to arrange for one speaker for this meeting from the other side of the line, and it was a great pleasure for me to bring to you my old friend, Prof. Pearsons, whom I have known so many years.

DAIRY EDUCATION.

By Prof. R. A. Pearsons, Cornell University, Ithaca, N.Y.

I wish to thank you heartily for such a cordial welcome. I have a friend who lives on a farm in the State of Missouri, and he claims that his farm is the best farm in the world; he says, "Why should not it be so, it is the best farm in his township, and his township is the best in the county, and old Pike County is the best county in Missouri, and Missouri is the finest State in the United States, and of course, the United States is the finest country in the world. (Laughter.)

Now, by a different line of reasoning, and a better one, and one which is convincing, I really feel to-day that I stand in the best, or one of the very best, cheesemaking districts in the world. (Applause.) I have had occasion to learn something of what you have been doing here. I have known of this place for a long time, but more especially in the last five or six weeks I have been hearing more and more about the way in which you have elevated the dairy industry to very near the top notch. I have heard this from a friend of yours whom I am glad to say is now associated with myself, and who is to-day at Cornell University, teaching a class of about a hundred young men how to make cheese. I refer to your friend, Dr. C. A. Publow. (Applause.)

When I was about to leave Ithaca, and shaking hands with him, I knew he felt as though he wanted to come with me, for he told me he hadn't missed a meeting of this Association for a number of years. Unfortunately, the work could not be arranged so that he could be absent. He wrote out this message, "To the members of the Eastern Dairymen's Association. Please accept my very best wishes that you may have at this time the greatest and most profitable convention you have ever held. C. A. Publow." (Applause.)

I shall be very glad to take back to the Doctor any messages you wish to send, and I will carry them postage and duty free, unless you put too much sugar in them. (Laughter.)

I do not believe in flattery, but persons who have accomplished what you have accomplished have a right to know about it, and to know what people on the outside think about it. I want to congratulate you upon your accomplishments. I might mention several things upon which you can be congratulated, but especially I want to congratulate you upon the high character of those who are occupying public positions and devoting themselves to the up-lifting of the dairy industry in this great Dominion.

A dozen years ago it was my privilege to come over here and make the acquaintance of Prof. Robertson and Mr. Ruddick. Since then I have been on this side of the line often, but have never come here without feeling that you have honest able men, and that these men are anxious to go out of their way to make any sacrifice for the benefit of this most important line of agricultural work. I tell you it is an inspiration to me, and to many others on our side of the line to come in contact with you people over here. (Applause.)

Why is it that so large a body of men of affairs have gathered together here this afternoon? Why is it that this county enjoys such a wide reputation for its dairying products? Why is it that you spend in four years' time $144,000 for the betterment of twenty-three cheese factories? Why is it that you people here seem so anxious to gain and maintain the leading position in the dairy progress of the world? The answer to all these questions is the same, it is "Dairy Education."

The topic which it was suggested I should speak to you upon this afternoon is "Dairy Education." It seems like carrying coals to Newcastle for me to come over here to talk to you on any phase of dairying, and yet I am glad to do the best I can. Dairy education is that training which enables one to do his dairy work in the best possible manner.

The problems of dairy education are quite similar in your country and my own, and I think it might be interesting and encouraging to you if I tell you a little about what we are trying to do in the United States in the line of dairy education. Here you have a large number of successful dairy people, so have we in the States; you have also a number of unsuccessful ones. I learned that this morning; I had never suspected it before. But you have, as we have, a large number of persons that cannot honestly be said to be either successful or unsuccessful; they are on the fence. Then too, you have, as we have, a large number of persons who want dairy education as is shown by this large and splendid audience here to-day. I never attended a dairy meeting where I felt I was speaking to a better audience than I do at this minute. (Applause.) You have also, as we have, a number of persons interested in dairy work who seem to have conscientious scruples against learning anything. (Laughter.) They are a great deal like the fourteen year old boy who would not take bitter medicine. The only way you can get anything into these people is to wait until they holler and then stick it in quick (laughter); and they always do holler sooner or later.

Then, too, in your country, as in ours, there are a large number, I am afraid, of persons who are interested in dairying, but are indifferent. They get into a little trouble and they rouse themselves enough to call on someone to come in, and that other man's brains helps them out of their trouble, and when that is over, they turn over to go to sleep again. The number of those who want dairy education in Canada, as in the United States, is increasing, and there are various reasons for this. One of the chief reasons is competition. Competition is the life of trade. There is competition between employers who seek to find the best employees. Sometimes these employers are a little slow to support their claims for efficiency by offering reasonable pay, yet they are coming to that.

Then there is the competition between those engaged in the cheesemaking business as well as those producing material for making cheese, and the best ones are the ones who are winning.

Two years ago I went to the State of Maine to visit the old home of my mother, and from Bangor I rode out in a stage coach twenty miles to the little town where she was raised. I was there a few weeks ago, and a trolley line is now operating between Bangor and that little town, and I found that the stage coach had been cast aside, and they were rapidly following the best new methods and new ideas, and very rapidly replacing the old. Why, almost everything is changed. I have heard people say that everything changes, but there are three things I believe, that don't. The way we eat does not change, the way we drink does not change, and in a few of the songs I heard this afternoon, I think the way we make love does not change. (Applause.) In the old days when transportation was poor, and most of the manufacturing products of any district were consumed in that district, it made little difference to Mr. A., cheesemaker here, whether Mr. B., cheesemaker there, was doing work better than he or not. Mr. B. could not get his cheese over to Mr. A's customer. But to-day the world is a great family. We can put cheese on the train and it will go anywhere; and if the cheesemaker here or in this district, becomes careless and lax in his methods so that the quality goes off a little, and this other man is up and knows how to do things, he will come over and take the first man's market right out from under his feet. (Applause.)

I am ashamed of my own country. Didn't you do it here? (Applause.) I guess you have heard of it. (Laughter.) But I tell you, my friends, we are going up. Why, that 95 per cent. of the prize money you took for cheese at Chicago (applause)—that was in 1893,—is only a scar on us now. You cannot judge us any more by that scar than you can tell the character of an Irishman by examining the bumps on his head. (Laughter.)

I tell you we have changed since 1893, and we are continuing to change. The man who knows the details and who works out his knowledge is the one who is going to succeed. (Applause.) And that means the success of our merchant princes, and our great manufacturers and our doctors and our lawyers. The man who does not know the details, and acts according to his knowledge, is the one who is going to get left in the race in life. I want to tell you something of how we are handling these things in our country. I am free to admit that we take good ideas wherever we can find them, and we have taken a good many of them right from Canada. (Applause.) We have Agricultural Colleges in every State. These Colleges are supported chiefly by the State Governments. In our own State we have a State College of Agriculture, and last year the Legislature appropriated for our use $225,000. It took a long time to get the Legislature of the State to see what the farmers are entitled to, and the farmers were asking persistently for years before any noticeable result was visible, but at last they roused themselves up and shook off their sleep, and the result was the Legislature made liberal appropriation for agricultural education in New York. Dairying is taught in most of these Agricultural Colleges, and in those States where the dairy industry is important, good professors are being provided. For example, in the State of Pennsylvania there is a building used for dairy instruction alone which cost $100,000, and at Cornell University, we have an equipment used alone for giving dairy instruction that cost $100,000, in Wisconsin the dairy building cost $80,000, in Iowa $63,000, and Missouri $40,000, while in South Carolina, away down in the land of rice and tobacco and cotton, the farmers have learned that these crops are depleting their land, and they are going into dairying in order to recover their loss, and they have a building that cost $15,000. I might name a dozen States with buildings valued at from $5,000 to $15,000 each. We teach dairying to our long course students who are with us four years, but I find the course that is attracting most attention is the short course like yours, lasting for a few weeks during the winter. Some schools continue them for twelve weeks, some of them only eight weeks, some of them four weeks, and now some special courses are given which continue only two weeks, or even only one.

One State reports that there have been 3,000 young men register in the dairy schools since it was established, about the time you were taking honors at Chicago. Another State reports 2,000 young men, and there are a number of others that have from 1,200 to 1,500. These courses are free to all; the only requirement is that one shall be sincerely in need and want of dairy instruction.

The character of our winter course of instruction has greatly changed, and I think in the next few years there will be considerable more changes. Now they put in so much time at butter making, so much time at cheese making, and milk testing.

Gradually our ability to give instruction along other lines brought about new courses that were first introduced for the long course. Marketing milking instruction is being introduced at our dairy school, and we have a special course on dairy problems. So many of our men are in special need of a drill in arithmetic so that they can figure correctly and accurately and see the fine points in percentage and decimals.

The number of valuable subjects for instruction in dairy schools is increasing and the tendency seems to be to arrange these courses so that a man could come, and in a short time, do justice to more than a few subjects; and so arranged that a student can select a particular line of work in which he is most interested, and if he wishes to become proficient marketing milk work or milk inspection for a city position or factory inspection, or dairy inspection, or if he wishes to become proficient in the making of butter and cheese or of ice cream, or dry milk, condensed milk, milk sugar, dry casein, or milk beverages, or wishes to fit himself for a position in a dairy supply house, the probability is that before very many years he will be able to find a course adapted to his requirements.

Thus far we have not introduced all the subjects, but we are tending in that direction. In addition to our dairy schools, there are more Agricultural Colleges that give dairy instruction, so that to-day altogether in the United States there are 55 different places where one can go for dairy instruction, and we have a good many dairy Associations. There are seven Associations covering the field extending beyond the lines of a single State, and 40 State Dairy Associations. We have also experimental stations and a National Dairy Office from which they issue timely bulletins upon dairy subjects. We have a great number of dairy papers, some of which are circulated in this country.

Our Farmers' Institutes deserve to be mentioned because of the particularly useful work they are doing along dairy lines in some States. Only a short time ago I was invited to attend an Institute which was held in a barn: do you have them here? (Cries of "Yes; a few of them.") The gathering was held right in the cow stable in the presence of the cows, and the important things in barnyard management were pointed out, and no man would be willing to tell a lie right there in the face of the cow. (Laughter.) The proper way to ventilate barns was mentioned. We have tuberculosis on our side of the line, and it has spread in our section very badly, and many of our farmers have not yet learned that if they would avoid the spread of tuberculosis they must keep sanitary stables, and must provide more air and more comfortable quarters.

We have plenty of unprofitable cows on our side of the line. There are not many dairies but what have some one or two cows that are not paying for their keep. The experiments conducted at our own station to show whether or not the cows were to blame, will illustrate that point. Professor Wing went out ten miles from Ithaca and found a little herd that has been cared for the same as the average herds in that county, and he found that the herd belonged to a farmer who could be trusted to do what he said he would do, but nevertheless was shiftless. He bought these cows and said, "We would like to have you take care of these animals for the next year," and that was agreed to. The animals were left right where they had been, and every week Professor Wing or his representative went out there and took the weight of the milk, and samples for testing, and at the end of the year we knew exactly what each one of these cows had done under the management they were accustomed to. Then the whole herd was taken to the experimental station, and there they were fed and cared for as our own cows were cared for. It cost a great deal more feed for a single year, but how the milk average did increase! Some of these cows actually doubled in the amount of milk and fat that they gave, as compared with the last year, just because they got good feed. The cows were not to blame. The man who had these cows was to blame. They were kept at the experimental station another year, and they did not make much more increase in their yield, but their physical condition improved very materially, and then we had the records for three years. One year on the farmer's place, two years on the experimental station, and each year at the experimental station was about double what it was at the farmer's home. The fourth year the cows were sent back to the farmer's home. It was not right to punish them that way. They were given the same care they had three years before, and the results at the end of the year was just about the same amount of milk, and that was the most conclusive proof that the cows are not fairly treated.

Now, I want to say a few words to the factory men of this audience. I was told there would be a good representation of factory men here, and I believe that is correct. Factory men must stand together or they will fall together. You cannot stand apart.

I want to say to you factory men that you have it in your power to do more to uplift dairying than any other force that is working. It is in your hands to do it; it is your first duty, of course, to do your own work well. and I know you will not need advice from me on that point. It is surprising what difference there is in men. Dr. Publow, down there at Cornell, divides a lot of milk up into six different vats, precisely the same milk, and six different students are put at these same vats, and at the end of the day here comes whey testing, one 12/100 and one 32/100 of 1 per cent. fat. That is the man; it is not the milk. Factory men ought to be enthusiastic about their work. Some of them do not know anything more about enthusiasm than the woman did about homiletics. She was introduced to a professor of homiletics, and finally she said, "What is homiletics? Is it a new breakfast food?" (Laughter.) The man who is enthusiastic about his work does not complain about drudgery; Dr. Bailey said at a meeting of our students that drudgery is under a man's hat. Let a man be interested in his work, and he will not think it drudgery.

The second point is that the factory man should be an aggressive but modest educator himself. He ought to be a little dairy school all by himself. Remember always that what helps the patrons helps the factories. Take tuberculosis. You have lots of data in this country on tuberculosis. We had an interesting experiment. Six cows were put into one stable. It was unsanitary, poorly ventilated and poorly lighted: and six others put into a stable that was sanitary, with good ventilation, and good light. In each case there were four that were known to be healthy, and two that were known to be diseased. These cows were kept in the two stables under all conditions alike for seventeen months, only the two diseased cows here were changed with the two diseased cows there at frequent intervals, so that the healthy cows would be equally exposed. At the end of the seventeen months all twelve cows were killed, and it was found that two of the healthy cows in the sanitary stable had taken tuberculosis and were developing the disease in a very small way, and it was found that all four of the healthy cows in the unsanitary stable had acquired the disease, and it had already come to an advanced form. And your patrons ought to know of an experiment like that. How are you going to get it to them unless you tell them about it at the factory meeting? In New York State we have about 200,000 people producing milk. If we should invite them to come into the dairy school we would have to have classes of 20,000 each winter, and keep it up for ten years, before we could take care of them all. They will not read the papers; some of them won't even look at the pictures. It takes personal contact, and the men in charge of the factories are the men who have an opportunity to exert that personal contact influence. Take the cow records. You have figures enough in your own country. Some of the best I have seen are from these Canadian herds. Get these farmers interested in the subject; make it more profitable to them, and it will react in favor of the factory. Talk farm management, talk anything you please in the interest of better farming and better dairying, and, above all, talk sanitary milk, talk clean milk. (Applause.) Now, we used to tell the farmer arbitrarily to keep the dirt out of his milk because it will result in poor cheese or butter, but it was hard for us to give scientific explanation of it. Dr. Connell explained it to us this morning, and we have been hearing for many years about bacteria, but the farmers who have been caring for the milk do not know anything about that, and it is for you to tell them. I carry a bacterium around with me all the time. I will have to confess in advance that it is an imitation. (The speaker here took from his pocket a rubber imitation bacterium, and inflated it.) If you should get a bacteruim and increase its length about 200,000 times, then you will have a little object about six inches long, and if you should increase the rest of his proportions in the same way you would get an object which at a distance would not look very different from what I am going to show you. It has no legs, no arms, no eyes; it is nothing but a little plant with just a cell wall on the outside corresponding to this rubber, and inside it is a mere jelly-like substance, and they float about in the milk even in favorable conditions. They absorb their food and expel their waste products through the cell wall, and make the milk sour and cause gas, and so on. Gentlemen of the factories, it is for you to take that message from Dr. Connell this morning, and teach the patrons something about bacteria so that they will know the reasons for it. The patron says: "What is the difference if there is a little straw gets in the milk, or a few flies; why, you can strain them out." Yes, you can, but Prof. Easton tried an experiment to see how many bacteria a fly carries. He went out in the kitchen and caught one hundred flies in a net and put all of them in a pint of sterilized water and washed them around a little bit, then he counted the number of bacteria in the water and divided them by one hundred, and found that a single fly carried 300,000 bacteria, and Mrs. Easton felt very bad to think there were such dirty flies in her kitchen. Then he went out into the barn and got 100 more, and did the same thing, and he found the flies from the barn carried 800,000 bacteria, and then Mrs. Easton felt better. Then he went to the pig pen and caught another lot of flies, and counted the number of bacteria they were carrying, and he found each fly in the pig pen averaged a million bacteria. Then he went to the swill pail and did the same thing. and each swill pail fly was found to average one million and a half bacteria. Well now, bacteria by itself are no harm; a million of them are no harm. You have got a million of them on your hands this very moment. But take a million times a million times a million and you have enough to do some harm, and it is for you to impress these facts upon the patrons so that they will see the reasons for things, and then it is easy for them to keep bacteria out of the milk.

Civilization is marked by the extent to which science is made a part of our daily lives, and that is an additional reason for spreading this gospel of dairy science until more and more men know it and act it. It will take a long time to get them all. Sometimes our feeble efforts seem a great deal like hunting birds with bear shot, but let us keep at it, always hoping, always believing that the last wayward brother will be brought into the camp of dairy science, truth, and efficiency, at least by the day of the millennium. (Applause.)

Prof. **Ruddick**: A gentlemen asked me a question, and I said if he would write it out I would endeavor to answer it if opportunity afforded. This is the question: "When these Montreal men purchase a shipment of gilt edge cheese for which they agree to pay a gilt edge price, do you consider it honest and proper for the maker and salesman to allow in that lot some cheese that they know are in some way inferior, thinking that these few may pass unnoticed, and they will therefore get the premium on the whole lot without marking these so they can be brought to the notice of the buyer, and get a price they deserve?"

This is a question of dairy ethics, and I would rather some one else should answer it. I must say that the salesman or maker who deliberately puts in a lot of inferior cheese to go in the lot of good cheese without making reference to it, and hopes to get the full price, has not any right to complain if a few of his cheese are rejected, or the whole shipment is rejected. I think the two things are on a par. There is a great deal to be said on both sides of any question like this, and we have to be fair on both sides, and I do not think there is very much difference between sending a few cheese when the most of his are inferior, hoping to have them slip through, and the man who finds a few bad cheese in the lot and rejects the whole on that account.

MONTREAL CHEESE MERCHANTS TALK.

The Chairman: We have representatives here from the Montreal Produce Association. Years ago there was a spirit of antagonism between the buyers and the salesmen; now, I am glad to say that that spirit has greatly departed, and I think it is largely due to the attendance at our yearly conventions of representatives from the Merchants' Association. They come here to talk to us, and we find they are not bad looking chaps at all, and they are not inclined to do anything wrong, and probably they have their trials as well as we have. We are always glad to have them here, and to-day we have Mr. Ayer and Mr. Hodgson, we will be glad to here a short address from each of these gentlemen.

Albert A. Ayer: I am glad to be present here to-day in this record county for cool-curing rooms in the manufacture of cheese. I think I may be permitted, at the risk of offending the Senator from Leeds County, to say that this County of Prince Edward in 1906, in the judgment of the Montreal merchants, had the record for making the finest cheese. (Applause.) In the Province where I come from, we think it is pretty good for a dairy to average $40 per cow per season, but in Leeds county there are several that run $80 per cow. (Applause.) I was in hopes that we might have a photograph of these farmers and their stables and dairies and cows, as a sort of memento of this great convention.

I have heard a good many remarks about the quality of Canadian cheese. I think I ought to know something about it, and I am quite prepared to say before this assembly and the world: *we make the finest cheese in Canada that are made in the world.* (Applause.) Now, I am stating that in its broadest sense, and backed up by the Montreal merchants who have been in business 25 years, and I have been in business a great deal longer than that. I have seen cheese from all parts of the world, and I think our opinion ought to be worth something, and I say we make the greatest quantity or the greatest proportion of the finest cheese in the world.

I do not mean to tell you for a moment that there is not a finer cheese made in England. Mr. McCargar was in England two years ago, and this very question came up about the finest cheese. There was some cheese that cost eighty-four shillings. He said to an English friend, "I will take five cheese right across the lot, just as they come in, and I will take five cheese out of a Canadian factory, and I will put down the five Canadian cheese right beside the other, and we will judge the five cheese, not any single one." The other said, "Who shall be the judge?" and Mr. McCargar said, "You shall be the judge." The cheese were put down, and there was one of the English cheese better than any of the Canadian cheese, there were two of them that were equal to the Canadian cheese, and there were two of them very much poorer. The Canadian cheese were all alike, and the man was obliged to admit that the five Canadian cheese were better than the five English cheese. (Applause.)

It is on that principle that I say Canada makes the finest cheese in the world. It used to be said cheese are cheese. Well, now that is no longer so; quality will tell.

I have enjoyed the addresses delivered during the day. There are four houses in Montreal dealing in cheese that were in business twenty-five years ago. There is only one that has been in business forty years, and I can count up between thirty and forty failures during that time, or an average of one a year.

The basis of making good cheese and butter is in one word—*cleanliness.* I may venture to say that there are very few manufacturers of butter and cheese who cannot make a good article if you will give them good milk to make it from. There have been few improvements in the stables, few improvements in the care of the cows, few improvements in the mill, and not a great many, though there have been some, in the improvement in the feed. We know a great deal about making, and very little about how to get your milk. When the women begin to take an interest in the stable as they do in the kitchen, then we will have good milk. Women should boss that job. (Applause.)

I had a few experiments on tuberculosis on my own herd by Dr. Moore. I am a farmer, and we still have the home farm, and I am proud to say I have a son who is a farmer. (Applause.) Dr. Moore examined the herd and he found three cows that showed strong traces, and three cows that showed slight traces. He said, "I should like to kill the three cows," and he did. One showed it very badly, and two bad enough. This was in the spring of the year, and we took three others and put them in a field by themselves, and between two and three months afterwards every trace was gone. I asked the doctor what was the trouble, and he said, "The stables."

There are too many stables in the Province that are not properly attended to. We must have clean stables for clean milk and healthy cattle. I was told about a woman who married a carpenter who had thirty acres, and he was trying to keep two cows on the thirty acres. She thought she could keep four, and she gradually kept getting more until she kept thirty. What do you think of that for a woman?

I am a crank on the cool-curing rooms. I always prefer to deal with a man who has got good judgment. I say, also, use a salesman that has good judgment; if he knows all about cheese so much the better. I recommend small factories to sell only once in two weeks. You cannot compete with big factories unless you follow out that rule. Poor boxes are a great evil. I drove out to see two of your local factories; I had heard about them and I went out to see them. I saw them with my own eyes, and I know all about them, and that is what you must do. You must see things if you want to be impressed by them. And if you would see your boxes where they arrive in England, it would be a good thing.

The Montreal Produce Exchange needs your help to get a lower rate of freight, and a better class of bill of lading, and a quicker delivery and better cars and better service; and we need a legislation passed here to-day so that we can get a census of the butter made in Canada. We want the Government, or somebody, to get behind the transportation companies, and make them give us greater returns. We want to know how many cheese are coming into the city. We want to know how many cheese there are in Canada.

Mr. McGregor: I would like to know the mode of procedure whereby they get 30 cows on the farm of 30 acres?

Mr. Ayer: It was sandy land, and it was nearly all put into corn.

Mr. H. A. Hodgson: I came to Canada in 1874, and with Mr. Ayer I can say I am the son of a farmer. I came to Belleville in 1877, and I have been during that time, until 1893 right amongst the farm industries. I try to get to every convention. I was at the first convention in 1877 or 1878, when the key-note was cleanliness. There is one thing an Englishman will do, he will pay for the real article, therefore we must keep up the quality.

I have been afraid for the last few months that the business would go back on account of the farmers selling their cows, but I am glad to know it is the poor cows that they are selling. I think sanitary inspection has been one of the most important steps. I have visited factories after the inspectors have been there, and I have found them properly fitted up, and there was no more trouble about getting the nicest, sweet-smelling flavor. We must always realize that there is a higher plane to be reached. I hope you will get great benefit from this meeting.

Whenever Mr. Barr wants to come into our establishment he has the run of the place. He has the privilege of inspecting any butter or cheese in the place, and if any factories want their make inspected it can be done without any trouble.

I hope this Dairymen's Association will legislate against whey butter. We already have legislation against oleomargarine. I have not yet seen a first-class article made from whey, and if you start putting it on the market you will injure the reputation of our creamery butter. (Applause.) I think we are justified in asking the Government to prevent any manufacture of whey butter.

Hon. Nelson Monteith being called upon by the chairman, said: I am sure it would be quite unkind of me at this stage of the meeting to make any lengthy remarks. I hope at a later period of the day to have an opportunity of speaking at greater length. I am pleased, indeed, to have the privilege of meeting with the men and women who constitute a great part of the constituency of eastern Ontario.

I sometimes feel, in disputing as to the amount of money we can afford to give to the dairymen with my colleagues, as to whether we always get value. I am glad to come down here this afternoon and get renewed enthusiasm, and go back and fight for what I believe to be your interest in getting larger grants. (Applause.) If you will just take home and put into practice what you have heard this afternoon in regard to the various features of the dairying industry, I prophesy that instead of our dairying products being valued at $100,000,000, they will amount to $200,000,00. It is not so much what you think as what you do. Action is the sum total of life, and if you here to-day resolve to do a great many things, remember that your resolves will amount to naught, except you put them into execution;

and that is my word to you—to apply what you have heard as closely as you can. I feel it is up to the producers and the farmer on the back concession to meet with us and respond to our efforts in carrying forward to a greater degree of excellency this important branch of agriculture. I thank you. (Applause.)

ROUGH DIAMONDS.

By Thos. McGillicuddy, Department of Agriculture, Toronto.

A friend of mine made a trip around the world, and one day was riding on the back of a camel along the bank of the Tigris, when the following story was told to him by his guide:

Many years ago in the far east there lived a farmer named El Hafed, who had land, and flocks, and herds, and a comfortable home. But he was discontented, and told his regrets to an old Buddhist priest who happened to be visiting the place. "If I could find plenty of gold," said El Hafed, "I would dispose of my farm, and live at my ease in the city, and be happy, for there is nothing so valuable as gold." "Gold is a cheap thing compared with diamonds," said the priest in reply; "you would be rich for life with a handful of diamonds." And then he told El Hafed about diamonds; what they looked like, and where they might be found. The latter grew more dissatisfied than ever, and soon sold his farm and belongings, and went hunting diamonds; but he never found them, and, at last, poverty stricken and broken hearted, he flung himself into the sea and perished. Next year the old priest visited El Hafed's successor, and noticed on a shelf a peculiar stone. His eyes glistened with surprise, as he asked: "Where did you get that?" "Out on the farm, near the creek, when watering my camels, "said the farmer; "the place is full of them." The priest caught his friend by the hand and danced around the room with joy, exclaiming: "Why, man, your fortune is made. Diamonds! Diamonds!! Diamonds!!!"

Then the guide flung his cap into the air, and said: "If El Hafed had stayed at home and tilled his own land with his eyes open he would have been the wealthiest man of his time."

The Farmer is a Rough Diamond. Emerson says: "The true test of civilization is not in the census, nor the size of the cities, nor the crops, but in the kind of men the country turns out." The farmer is a rough diamond. But—

"A diamond in the rough is a diamond sure enough,
And before it's ever polished it's made of diamond stuff;
Yet, somebody must find it, or it never will be found;
Then somebody must grind it, or it never will be ground.
But when it's found, and when it's ground, and when it's polished bright,
That diamond everlastingly is giving out its light."

May I be permitted to quote from Tom Watson's "Life of General Jackson" an eloquent and well deserved tribute to the pioneer farmers who opened up the American wildernness. The words are equally applicable to the early settlers who found this Province a forest and left it smiling fields:

> "The historian, the orator, the painter have been eager in the duty of blazoning the deeds of our pioneer missionaries, lawmakers, and soldiers. The names of these heroes live, and deserve to live, in letters of light upon the records of our country. But to our pioneer farmers justice has never been done. Theirs was a combat calling for every soldierly trait of Capt. John Smith and Miles Standish. The patient courage which swung the axe in the depths of primeval woods was no less heroic than the bravery which made the musket conquer. The toil of the warrior's march was slight by

comparison with the homely but exhausting work of preparing the soil for the sowing of seed. The arrows of the red men were not more deadly to the soldiers than the fevers which arose from the swamps and pulled down the settler as he struggled to open out his farm. The story of the pioneer plowman is one of dauntless courage, of quiet heroism. He found this New World a wilderness, and he has well nigh made it a garden. His axe, his spade, his hoe, his muscle, his brain, his very heart and soul, have all been enlisted in the work."

There are about 170,000 farmers in the Province of Ontario. Most of them may lack some of the social graces that mark the dwellers in the cities, but they loom large in character. Our Governments recognize that they are rough diamonds, and are trying to find them, and grind them, and give them the polish that their personal and intrinsic worth deserves. For this reason we have our Agricultural Colleges, Experimental Farms, Farmers' Institutes, Dairy Schools, and well subsidized Associations for every branch of agriculture. At these gatherings farmers rub together—"diamond cut diamond"—and so get a mutual polish.

But, best of all, the farmer is finding himself. He has awakened from a sleep of prolonged infancy, has learnt that he is of age, and has come to claim his own. He now knows that—

"A diamond in the rough
Is a diamond sure enough,"

and he is beginning to appreciate the best polishing processes. Some of these agricultural diamonds have been found and ground, and have been scintillating in the public light. The Canadian farmer has commanded attention within our legislative walls, in the halls of education, and upon the public platform. Look at such names as Mills, Drury, Dryden, Monteith, Fisher, Robertson, Ruddick, Creelman, Zavitz, Dean, Day, and a host of others, who have made a reputation for themselves and for Canadian agriculture. And at the present moment a number of promising young men from the farms are in training under the eyes of our Governments, getting an academic polish at Guelph and elsewhere, and some of these are destined to bring still further glory to the sons of the soil.

THERE ARE DIAMOND VALUES IN THE FARMERS' WORKING PLANT. The amount of money invested in agricultural land, buildings, implements, and live stock—practically the farmers' working plant—is of surprisingly large value; and these values are genuine. The farmer never waters his stock to deceive the buyer—except, perhaps when he is selling his steers by weight. (Laughter.) The money invested in the farm equipment of this Province is given as follows in the last published report of the Bureau of Industries:

	1906.	1901.
Land	$661,199,920	$585,384,294
Buildings	273,414,187	226,575,228
Implements	71,197,619	59,897,513
Live Stock	183,307,394	129,496,261
Total	$1,189,119,120	$1,001,323,296

This total of $1,189,119,120 is equal to seven times the assessed value of Toronto, the capital city of this great Province. It means, also, an average of about $7,000 for each farmer. It is interesting, too, from a social, financial, and economic standpoint, to observe that this immense amount of rural wealth is much more equally distributed than in the case of any other class of people. In the cities, great wealth and great poverty are to be seen, often side by side. But among farmers, while there may be no great wealth there is no poverty. During the five years 1901-1906 the value of the working plant of the farmers of Ontario has increased by about $188,000,000, or fully an average of $1,000 for each owner of a farm.

FIELD CROPS HAVE DIAMOND VALUES. The field crops of the Province for 1906 were valued at $144,570,075, an increase of $16,244,427 over the showing of 1901. Some of these crops are rough diamonds, so to speak, and by skilful feeders are turned into the more polished balanced ration. They are fed to dairy cattle and other live stock, and in this way the richness of the land is maintained, and even increased. By growing clovers, peas, and other legumes, up to date farmers are also able to snatch and store nitrogen from the air, and thus give added wealth to the soil. The silo this winter is also proving a sort of diamond mine to some farmers.

LIVE STOCK HAVE DIAMOND VALUES. The value of live stock in Ontario, in 1906 was $183,307,394, a gain of $53,811,133 compared with 1901. The live stock sold or killed in 1906 were valued at $61,528,288, which is equal to one-third the value of the stock kept on hand. This fall and winter there has been an unusually heavy slaughter in both animals and prices; but many old and light milkers have been thus disposed of, and it is more than likely that some dairymen will be able to say with the Psalmist that it was good for them that they were afflicted, for in this way selection has been forced upon them. Considerable of the live stock sold have been of a class similar to that described by a railway adjuster of claims, who remarked that it seemed to him that nothing improved the value of some breeds of live stock like crossing them with a locomotive. (Laughter.)

MILK, BUTTER, AND CHEESE HAVE DIAMOND VALUES. In this connection we may regard milk as the rough diamond, and butter and cheese as the polished articles. There is said to be a danger of Niagara decreasing in its flow, but everything points to an increased milk flow in this Province. The town and city milk supply is becoming a most important feature of Ontario dairying, and it never has had a real part in the deliberations of this body. Is it not time that a place for the discussion of this topic was given on our Convention programme? The production of clean, well-flavored milk for urban consumption, to be delivered regularly, promptly, and in best possible condition to the consumers, is a problem worthy of the best consideration of dairymen of every class: for the larger the town and city use of milk the better price there will likely be for milk for creameries and cheese factories.

According to the last Crop Bulletin of the Bureau of Industries, there were 1,152,071 milch cows in Ontario in 1907. It is claimed that the average annual yield of milk per cow in this Province is about 3,500 lbs. This would make the total milk yield nearly 4,000,000,000 lbs., worth about $40,000,000. This immense yield could be greatly increased at a small relative cost by a system of testing, culling, and general selection. It is calculated that the first 3,000 lbs. of milk given each year by a cow is only about sufficient to pay for her keep, which means that many cows give little or no profit to their owners. The profit, then, must come from what the cow gives over this actual cost standard of 3,000 lbs. In that case the Holstein cow Boutsje Q. de Kol Pietertje of the Ontario Agricultural College dairy herd, must be a gem of the first water—if one may dare to use the word "water" in connection with a milk yield. This excellent animal, during the twelve months, October 27th, 1906, to October 26th, 1907, gave a total yield of 20,778 lbs. of milk. The butter fat averaged 3.76 per cent., varying from 3.0 to 4.3 per cent. and totalling 781.91 lbs., (or the equivalent of 912.22

lbs. of butter), valued at $190.38. During the thirty days of November she gave 2,522 lbs., compared with an annual yield of 3,500 for the average Canadian cow. In one week she gave 643 lbs., and in one day's milking she yielded 96 lbs., of milk.

Now, a Boutsje, like a Kohinoor or a Cullinan diamond, is not to be picked up every day. But selection, testing, and feeding will be sure to improve any herd, and so make the chances of finding another Boutsje more likely.

Our Factorymen are Rough Diamonds. The men who manage the butter and cheese-factories of Ontario deserve consideration and support. They have done much to bring credit and gain to Canada by the excellence of their product. Our Dairy Schools are doing much to inform and polish them. May they be more than ever ambitious to excel in the markets of the world. Long may they give to us the cheese that we delight to taste, with its exquisite nutty flavor and mild, fetching tang, and that tender, mealy yet firm body that dissolves upon the tongue like a sweet dream on the waking mind. And ever may our creamerymen make for us that glorious butter which reminds us of the odorous breath of the cow and the aroma of the sweet-scented clover pasture, and whose delicious flavor lingers on the palate like the memory of a first love.

OPENING SPEECHES AT THE EVENING MEETING.

President **Dargavel**: This Association feels very much gratified at the reception it has received at Picton, and the success of the convention. When we were invited to come here we had some little hesitation in accepting. There were several other towns anxious that we should hold our convention with them, but we thought that Prince Edward County deserved recognition on the part of the Association, and we had on the Board for years a very enthusiastic director, Mr. James Anderson, whom you all know, I presume. (Applause.) And he was very insistent that we should go to Picton, and we had learnt to know that anything Mr. Anderson sets his mind on he is pretty sure to get, and we also knew he was an active member of the Association, and had done a great deal for the Association, and that he deserved some recognition. I can assure you that we have not regretted the decision that we arrived at. We have never visited a place where we met with a more cordial reception and apparently a deeper interest has been taken in our work, and it is a great incentive to us to come to a place where our work is appreciated. Last year we had quite a different experience. We held our meetings at the city of Ottawa. They have very many other attractions there, and perhaps they did not have a James Anderson in that section to liven them up and get them interested. I think perhaps, that has something to do with it. At all events I must say the reception we met with there was of the opposite character to what we have met with here. We have brought here the best talent we could procure in Canada, and some from the United States, and we hope that this meeting will be a benefit to the dairymen of this section. I am sure the people of Picton are greatly interested or they would not turn out in such great numbers to hear the addresses. I am very pleased that they have manifested the interest that they have. It is another example of the intelligence of the people of Picton. It is a remarkable fact that in some towns the people do not seem to appreciate what the advancement of the dairy interests and the agricultural interests of this country means to them. While we do not belittle the interest of the manufacturers, because we appreciate the wonderful growth of manufacturing in this country, and how necessary they are to the welfare of the towns and cities, we must remember that the prosperity of this country depends upon the farming community. We hope the good Lord will bless us next year with a favorable season, and that the lessons that we may have learnt from the little setback we had this year will be a benefit to us, and that we will go forward in the future with greater strides than ever, and that the year 1908 will be a record breaker for us and the agriculturists of this country, and thereby to the interests of every person, be he engaged in commerce or manufacturing pursuits of any kind. I thank you again for your enthusiastic assistance to the meetings that we have held in this town. (Applause.)

Rev. Mr. Emory, Picton: I would like to say that I appreciate very much this courtesy and consideration extended to me on the part of the convention, but I remember the advice my mother gave me once. I asked her a question, I shall not tell you what it was, but her answer was "Never abuse parlor privileges," and I shall not abuse platform privileges to night. There are those who have come from afar to speak to you, and I shall not so far forget myself as to trespass upon their time or upon yours. I would like to say, however, that I have enjoyed very much the sittings of this convention. It is a privilege to listen, and I may say that I have not been a disinterested listener; I have been an interested listener, and I have been a pleased listener, and I have been a profited listener. Anything that can be done for the farmers or the producers is of the very highest profitable assistance to the state, for the farmers are at the very heart of all national prosperity, and are indirectly related to all other prosperities and to all institutions that cluster about a nation.

We have no regrets, I may say, that we placed our church auditorium at your disposal. We are thankful and we are glad; and all I have to say is that we are glad you came, we shall be sorry when you go away, and we shall be glad to have you come again. (Applause.)

Senator Derbyshire: It is very seldom that we have to apologize, but we regret that Prof. Robertson will not be with us. I have just received a letter stating that it will be impossible for him to be here. On account of the great work he has done in connection with the dairy business in the Province of Ontario and throughout the Dominion we would have liked to have had his presence with us to-night. We recommended James W. Robertson as Dairy Commissioner for the Dominion because we knew he would be the right man in the right place, and we are proud of the position he occupies in the Dominion of Canada to-day. He has been selected to take charge of that great Agricultural College at St. Anne de Bellevue, Quebec. It is very seldom that we are disappointed in our speakers, because they are all glad to be with us, and feel that it is an honor to address this Association. I want to say, however, that we selected out of one of the factories of my good friend Mr. Macpherson a modest young man named Ruddick, and we started him out as one of the instructors to educate the makers in the factories as to how to make fancy cheese, and it was not long before he was selected to go to Ottawa to help the Dairy Commissioner there; and then they got word of him in New Zealand and took him over there to help them. But when we saw the style of man we had lost, we put up more money than these people dare pay, and brought him back, and he is now in charge of the great dairy work of this Dominion, and we feel proud of him. We feel proud, because the Eastern Dairymen selected this style of man to do this work. I am delighted with the reception we have received.

ADDRESS.

By Prof. R. A. Pearsons, Cornell University, Ithaca, N.Y

I have felt since coming here that I am among friends. I heard a new definition of friends a short time ago. A little girl was asked what friends are, and she said "Friends are people that know all about you, but they like you just the same." (Laughter.)

This is a very large audience. I would give a good deal if I could take a real good picture of the inside of this church to take back to our friends who are doing a little dairy work on the other side of the line, in New York State; I believe it would encourage them.

I am impresesd to-night by the fact that our industry is one of dignity. This audience makes me feel that way. I believe the dairy work is good enough work and large enough work for the best of us. Out in one of our western states some of our people felt the same way. One of their best men was chosen to represent that state, and he had to leave dairy work and go to Washington as a Senator, and a gentleman in the town said it was too bad for a man like that to be a Senator when he might be a dairy farmer. (Applause.)

I would like to impress one thought upon you, and it is this: That there is a great wave sweeping over the world that may be called the wave of sanitary reform. The good people are calling for more sanitary water for our cities, better ways of disposing of our sewerage, and they are demanding more sanitary methods of plumbing, even the physicians now have to conform to certain sanitary requirements which were unthought of a few years ago, and along with all these sanitary requirements they are asking for cleaner milk. We have heard a great deal about clean milk to-day, and we are going to keep on hearing about it; and you might just as well try to stop the talk about clean milk and better sanitary methods as to go down to the Bay of Quinte and try to sweep the water out of it. It is coming, and if you want to blame somebody for it, I will tell you who to blame. Just keep going backwards for 250 years, and back there you will find a Dutchman named Van Leeuwenhoeck, and when you catch him punish him; he is to blame. He had the habit of grinding glass into different shapes and forms. When he got a certain combination of lenses, and looked through them, he discovered that there were things to be seen that had never been dreamed of, and he is the man who is responsible first of all for our knowing something about bacteria. If you are not satisfied with punishing him, then go to Dr. Connell and men like him, who are in search of scientific truth and who are determined to announce it, whether it hurts anybody or not. Punish them if you want to. Science and truth cannot be stopped. We are learning science. What are we going to do about it? Why, there is only one thing for a sensible man to do when an argument is presented to him, and he is convinced that it is right, and that is, to acknowledge it and act accordingly. There is money in this new idea of clean milk production. I could tell you of many men who are getting money out of it. I will refer to only one, because he was one of the first in our country to become prominent in the work. Mr. Stephen Francisco was a poor dairyman in New Jersey about ten or fifteen years ago, serving milk from one or two little wagons, and driving one of them himself. About that time this sanitary wave struck his town, and the physicians were looking around to find where they could get milk that was reasonably free from bacteria, and they picked out Mr. Francisco as the man that might satisfy them. He agreed to do what they wanted, and they agreed to recommend his milk. To make a long story short, to-day Mr. Francisco has 500 cows upon his farm; 700 acres of land, and is selling his milk for nine cents a quart. It passes through no middle man. He is the director of a bank. His children have all gone to college. The family go abroad when they want to; they ride around the country in automobiles, and he is one of the leading citizens, and one of the most successful men in the place, and he made it all out of clean milk. (Applause.)

So I want to say to the dairymen of this country. Do not shy at the world's movements, try to profit by them. They are bound to come; and if you do not recognize them and act accordingly, they are going to push you right over and out of the way.

In our country we do all we can to encourage the production of clean milk. We try to emphasize the fact that milk may be contaminated in four different ways. It may be contaminated by the insoluble dirt that comes out on the strainer; and it may be contaminated also by soluble dirt; it may be contaminated by bacteria; and it may be contaminated by the product of bacterial growth. There is no way of treating milk that will overcome this contamination. The only treatment is exclusion, and of all the methods that I have seen suggested and tried, aside from getting rid of the worst of the dirt, the best is the use of the small top milk pail. I do not know whether you are using it here or not. By using that kind of pail you will keep the dirt from falling in. If one is in the habit of using a pail fourteen inches across the top, and gets one half that size, it will keep out a great quantity of dirt. I sent one to a farmer and asked him to try it and he sent back word that he could not get half the milk into it, and I guarantee that that man could direct a stream of milk from its source into a cat's eye. (Laughter.) I asked him to try the pail a little longer, and in a week he wrote and told me the pail worked pretty well. We find it keeps some of the dirt out of the milk and the farmers are getting so that they can use it pretty well, but there is one serious objection and that is if the cow gets her foot into the top part of the pail you will have to saw off her leg to get the foot out. (Laughter.) Prof. Pearsons then gave an exemplification of bacteria similar to his speech delivered in the afternoon and it was very much appreciated.

The CHAIRMAN: I have now much pleasure in introducing the Hon. Nelson Monteith. He is one of the best friends of the dairymen and I believe it was largely through his efforts as Minister of Agriculture for the Province of Ontario that the Government took over the entire cost of the instruction in dairy work, thereby enabling every factory to have an instructor. I am sure you will be delighted to listen to what he has to say.

DAIRY ADVANCE.

BY HON. NELSON MONTEITH, MINISTER OF AGRICULTURE, TORONTO.

It is with much satisfaction [here the speaker was presented with a beautiful bouquet of roses by a little girl, whom he very gracefully kissed]—I think I must now say with a double satisfaction—that I find myself among the good people of Picton and of Prince Edward County. It is my first privilege as a public servant to meet with the good people of this fair part of the great Province of Ontario. When memory goes back to the early history of this Province I must feel that I stand on sacred ground. In this grand old county of Prince Edward we find the first experiments in agriculture in the Province of Ontario. Here came the men from the neighboring colonies, and started to hew out for themselves homes upon the shores of Lake Ontario and the Bay of Quinte. Here was first tried the experiment of wringing from the stubborn soil that sustenance that has brought about the ideal conditions that we see manifested on every side. Here, we may say, was first grappled our earliest efforts at municipal government—a system of local self-government unrivalled in the history of the world (applause)—a system under which the individual can make himself most effectively fell. I might also refer to the fact that you have early believed in the value of co-operation in this county. You first started an agricultural society in the year 1833; through the agency of that society you introduced pure breeds of sheep, cattle and swine, and made the foundation of the greatness we have now attained in the dairy industry. This shows that you have come of a far-seeing, progressive stock of British people, and I might say that in looking out on this splendid audience I feel that we in Ontario have much to be proud of in our triumphs in the various lines of agricultural progress.

I do not desire to flatter, but I feel as I regard the splendid specimens of manhood and womanhood around me to-night, that in this temperate zone we have the climatic tonic which brings out the best energies of the people, for we have it exemplified in the intelligent faces that I am surrounded by to-night. (Applause.) And while we may not be great in numbers in Canada, yet, quality tells, and that is one of the things I wish to emphasize: the importance of quality in every line of production.

When we come to consider what has been accomplished in the last 100 years in this part of the Province of Ontario, I feel that there should be memorials planted on almost every cross-road to the men who have hewn out and brought about this that we now enjoy. I feel that we are too recreant in our duty, too forgetful of the lone struggle of the axe-man in the ever widening clearing. These are the feelings of one who has had told to him the privations, the difficulties, and the dangers incident to pioneer life. When I go, in the performance of my duties, to the outlying districts of this Province—to the northern and north-western portions—I find there pioneer conditions, and pioneer conditions entirely different from that of our forefathers in this older part of Ontario. While there is the isolation largely incident to frontier life, you have within easy reach the means of ingress and egress through the ever extending lines of railways.

We have a vast and unoccupied area in the northern portion of this fair Province, an area as yet little considered, little thought of, an area that is now being threaded by railways, and I believe in the near future will be thrown open for settlement under conditions which will give Ontario's sons ample opportunities to dwell in this old mother Province of Ontario. There we have stretching out, east and west, north and south, an area almost as large as the occupied portion of this old Province of Ontario, from Ottawa to Windsor—an area of between 16,000,000 to 20,000,000 of acres, and judging from what we have observed during the past year I believe it is capable of supporting a vast number of people. This splendid territory, we hope, will be occupied by Ontario's sons and daughters. This is one of the resources of this great Province. I, for one, would not be anxious to fill it promiscuously with a foreign population; because we believe that quality tells. Men imbued with the same idea of freedom—freedom in every sense of the word—are worth more to us as people than thousands of those who have no appreciation of what freedom means.

At the present time we look upon this Association as a strong auxiliary force working in unison with the Department of Agriculture, over which your humble servant has the honor to preside. We look upon it as an enthusiastic body of men working hard without hope of reward other than the satisfaction of doing a patriotic duty, and to these men all honor should be given. And to the ladies who scald faithfully the milk can from day to day, due tribute should also be given, because, after all, the gospel of cleanliness that our friends have been preaching here to-night, is of the greatest importance, and it has to be carried out by the women folk of the Province. (Applause.)

I wish to pay tribute to the faithful services of Mr. Publow and Mr. Mitchell in the East, and Mr. Hearns in the West, for their untiring efforts to see that the great dairy industry keeps forging to the front. I also feel somewhat of a paternal interest in the men who are driving along the back lines visiting the outlying factories, and preaching, not only the gospel of cleanliness, but that more skill and knowledge should be put into the product which comes from these factories. These men deserve well at our hands. Those who work in the farm stable or the barnyard, who see that the best conditions are maintained in the proper handling and production of milk, also deserve commendation for their efforts, and as a son of the soil I feel that we cannot emphasize too often or too strongly that the growth and prosperity of this industry depends upon the more skilful ability of the men who are growing the crops. Those of us who recognize this phase of the dairy business know that except we can introduce cheap production we cannot meet the competition as we should, and that cheap production can only be introduced by putting greater skill into our business; because, after all, skill is about the only thing we can sell at a profit.

I feel that we have to thank the ladies of this district for coming out and paying such a tribute to the great and honorable calling of agriculture. The dignity of a calling is its utility, and I for one, appreciate very much the fact of the ladies coming out and gracing this occasion by their presence. It is an incentive for us to go forward and do greater things, to conquer in fields yet unwon, and I trust as years and years go by that the ladies of our Province will still rise more and more to an appreciation of the dignity of this great calling of agriculture.

It was my good privilege to visit one of the Royal Agricultural Societies in old England, and while there I was much struck by the knowledge and interest displayed by the best class of old England in agricultural pursuits; and I feel that as time goes on, and as we rise to a proper idea of the dignity of this noble calling of agriculture, it will be more and more appreciated by every class in this great land called Canada.

The time is coming, and must surely come, when to be a land owner will tend to stamp a man as a man of affairs; and while we do not desire any class distinction such as they have in the old land, still much will be implied in the fact that a man is a land owner. Not only that, but when our manufacturers acquire wealth, as many of them are doing, they will seek that outlet for their energies and wealth and turn to agricultural lines, as it is in the old land, and with increased postal facilities, telephone facilities, and rural mail in the future (applause), I trust that farm life in this Province of Ontario will be much more comfortable and will be a good business to be engaged in.

I was much struck with what our good friend from the neighboring state said to-day when he spoke of hard drudgery. I have spent many years on the farm, but I have never yet felt that it was a life of drudgery, because

I was interested in what I was doing. (Applause.) I am sorry for the man who is waiting for the clock to strike at the end of the day. For me the days seem to end too soon, though I do not believe in long hours. Be interested in your business, and it will ease half the load of life. Put enthusiasm into your work and it will lighten the burden, if there be a burden.

My sympathy never went out to men of idle life so much as it did during the past year. I used to think what an ideal life it would be to sit around some of our first-class hotels and enjoy life. My ideals in that regard have been entirely shattered. I feel sorry for the man who has nothing to do; because, the man who is interested in some calling, and takes pleasure in it has one of the greatest joys of life. The joy of overcoming obstacles is one of the greatest joys that is given to man, and I believe the dairymen appreciate this. I trust this spirit may be abroad among our directors.

I must confess that the Hon. Senator Derbyshire and President Dargavel and the others who came to see me with regard to the matters of inspection and instruction succeeded in impressing me with the necessity of this work. The first fear I had was of getting through the estimate for such an increased grant; and then I felt that we might be infringing on the rights of the people if we said to them: "Here, you do this and you do that." But the more the matter was turned over and weighed, the more I became impressed that it was for the good of the whole people, and that should be the first consideration. (Applause.) And after a good deal of fatherly advice to the men entrusted with this important work of going out and inspecting and instructing—and I followed their work with a great deal of sympathy—I have found that after making up the roll this fall that we have undoubtedly made a step in advance. (Applause.) I find by the official reports on the quality of our cheese that it is as a general rule excellent, and this is almost entirely attributable to the work of inspection as carried out by our able staff of inspectors and instructors; and at this stage of the proceedings I would give fair notice that we trust that the lines may be drawn a little bit tighter and no great harm result during the coming season. It is our desire that our cheese shall stand unrivalled in the world's markets (applause), and I feel that we would be disloyal to this great Province of Ontario and to the Dominion of Canada and the grand old flag under which we live if we should shrink from doing our duty once we know it.

Just a word and I am done. I think the opportunity is at hand to say a word or two regarding the great movement that is abroad in our land, namely, the effort to better our homes through the medium of the Women's Institutes. These Institutes are gathering strength unexpectedly. I believe the homes of our people are equal to the homes of almost any other people, but we want those homes to be better than those of any other people, and that the best regarding food and clothing and sanitation should be known throughout the length and breadth of the country among the women of our country. I believe the opportunity is offered to the women of this county of Prince Edward to join with our Farmers' Institutes and take initiatory steps to organize, and they can depend upon it that the Department at Toronto will help them with their work in a financial way. (Applause.)

We believe, as it has been exemplified in these gatherings during the last day or two, that the coming together of people tends to broaden the mind, and tends to send us back to our homes with increased vigor and increased knowledge of our business. But, while it is one thing to know, it is another thing to do, and what we want is that this vast fund of information that has been so willingly given from day to day will be exemplified in concrete practice in our homes, in our dairies, and in every walk of life.

I thank you, Mr. Chairman, for this opportunity of meeting with the people of this part of the Province. It has been my fortune to meet with the people of the east and west during my short tenure of office, and I can say without flattering that it has not been my privilege of speaking to a more intelligent or comfortable looking people than I am privileged to speak to to-night. (Applause.)

A TRIP AROUND THE WORLD.

Mr. J. A. **Ruddick** gave an illustrated address on what he saw in connection with dairying in his travels around the world. This address was illustrated with lantern slides, and was very much appreciated.

Mr. **McLellan**, manager of the local branch of the Metropolitan Bank, moved a vote of thanks to the convention for coming to Picton and providing such an instructive and entertaining programme for all.

Mr. **Dolan**, of the High School staff, seconded the motion, which was heartily carried.

President **Dargavel**: This motion, I imagine, is rather out of place, but we receive it with thanks. The thanks should rather have come from this Association to the people of Picton and of the County of Prince Edward. We feel indebted to you for the more than courteous reception that we have received, and the hospitality with which we have been treated here. Not only have we been treated with a great amount of hospitality as an Association, but as individuals we received the hospitality of the citizens of this town; and while we are free to say that we have met with many fine receptions the last few years—because the people of this country, I find, are beginning to appreciate the work of this Association—I must say that this has been the finest convention we have ever had. The people of Belleville treated us very generously, and when it was voted that we should come to Picton, many of us, myself among others, who had not visited the place before, had certain doubts as to whether you could accommodate the Association, but we have heard of no one going hungry or going cold or without a good place to rest. A wonderful advancement has been made in the science of manufacturing cheese, and we think this Association has done its best. We have striven at each one of our conventions to bring the best talent to speak to the people in the way of instruction. (Applause.)

RESOLUTIONS.

Moved by Senator **Derbyshire**, seconded by **Geo. A. Putnam**, "That this convention of dairymen assembled, wish to express their deep gratitude to the citizens of the town of Picton for their able and energetic assistance in making this convention the greatest ever held in Eastern Ontario, and for their untiring zeal and thoughtfulness in looking after every detail in connection with the entertaining of their guests." (Carried.)

Moved by **Henry Glendenning**, seconded by J. H. **Singleton**, "That this convention of dairymen assembled do hereby tender their hearty thanks to the railway companies for the splendid accommodation accorded the dairymen attending this convention." (Carried.)

Moved by JOHN MCGREGOR, seconded by EDWARD KIDD, "That this convention urge upon this Dominion Government the desirability of taking a census of cattle (cows), and the make of the butter and cheese, both in the factories and on farms throughout Canada." (Carried.)

Moved by A. A. AYER, seconded by J. H. SINGLETON, "That this convention of dairymen assembled in the town of Picton, would strongly urge upon factory men the necessity of branding consecutively each vat of cheese with a designated number. The same number to be placed upon the boxes as upon the cheese in order that a fair and proper inspection of each shipment may be made, both by the buyers and the official referee at Montreal." (Carried.)

Moved by HENRY GLENDENNING, seconded by T. A. THOMPSON, "That this convention urge upon the Dominion Government the desirability of taking such means as may be necessary to insure correct returns from the railroads and boats of the daily receipts and shipments of butter and cheese into and from Montreal, and that the same returns be handed to the Board of Trade daily." (Carried.)

Senator DERBYSHIRE: For a great many years we have been trying to do exactly what is done this year, and still we have been unable to do it; but with the pressure of the President right at the foot of the Government in Toronto, we have been able to shove the business through this year. And while in other years there was no Minister of Agriculture who could stand up for a minute and discuss with the dairymen why they should not take over the entire dairy instruction work, the same as they do in the schools, they would not do it, we got the Government to do it this year, and I have great pleasure in moving, seconded by Mr. Anderson, "That this Association desires to express its gratitude to the Hon. Nelson Monteith, Minister of Agriculture for the Province of Ontario, for taking over the entire work of instruction and inspection." We believe that the good results which have followed have fully justified the Government in such action.

The PRESIDENT: As Senator Derbyhire has remarked, this is a very important resolution. Of course, the resolution itself is only a matter of courtesy, but the action which was taken by the Minister deserves the gratitude of every dairyman in the Province of Ontario. It is not alone the small matter of twelve or fifteen dollars to each factory, nor the great amount which was involved, perhaps some $15,000, but the great benefit accruing from the action taken by the Government was this: that there were about two hundred factories in the Province of Ontario that did not receive any instruction, and they were the ones that required it the most. Now, the reason these two hundred factories did not receive any instruction was that they do not contribute anything, and they would not join the syndicate, as they were not public-spirited enough to put up fifteen dollars to have their factories instructed or inspected. But it turned out they were wanting instruction far more than the better factories that were paying this amount. It is a great mistake to think that we are interested only in the products of our own factory. We are interested in every factory in Ontario, and the results flowing from the action of the Minister of Agriculture will be of great convenience to all.

THE CREAMERY OUTLOOK.

By James Stonehouse, Dairy School, Kingston.

If the past season was a disappointing one to the cheese-makers it has been none the less to the creamerymen. Expenses are growing heavier year by year, and the output is not keeping pace with the expense. In fact, there was a heavy falling off in production during the past year, and I might mention two or three factors which tended largely to bring about this result.

1st. We had a cold, backward spring, and feed was very scarce till about the middle of June. Consequently there was not the usual amount of cream to be had even if the farmers had been disposed to send it, but the cool weather and high prices for butter induced the farm people to churn their own cream.

2nd. The weather continued very cool all summer and where the farmer's wife was disposed to market her own butter, there was no extreme heat to prevent her from doing so.

3rd. The scarcity and consequent high prices offered for dairy butter caused a great many to make their own butter. There is a somewhat curious fact in connection with this last statement. When butter is selling high more women are anxious to make their own butter than when it is selling low. My creamery is always better patronized when butter is low in price than when the price is high. The reverse should be the case, for the patrons are less able to afford the price charged for making when the selling price is low than when it is high.

The market conditions varied considerably from those of the previous year. In 1906 the demand from Great Britain was good and prices were satisfactory. The price of creamery ruled the market for dairy butter, but during the past year the price of dairy seemed to have ruled the price of creamery butter, and I have never seen the price of the two grades of butter so near together as they were during the past season.

The explanation, to my mind, is that all grades of butter were too high for profitable export. Creamery butter more than supplied the home demand, and in the absence of a foreign market there was never a brisk demand for creamery. On the other hand, dairy butter was always in strong demand, and that part of the consuming public which prefers dairy butter seemed to be able to keep the supply exhausted, and consequently the demand was strong all through the season, thus bringing the price of dairy to within a cent or two of creamery for the greater part of last season.

Our large increase in population during the past two years has undoubtedly been a strong factor in keeping up prices, and it looks as if the same agencies will cause prices to maintain a righ level for some time to come.

The question of moisture in butter has been agitating the minds of a good many butter-makers in Canada during the past year or two, and the quality of the butter from some creameries has not been improved by the over-weening desire to incorporate a large amount of moisture and have a large over-run. The conditions necessary to incorporate an excess of moisture are usually detrimental to the quality of the butter and should be discouraged. The quality of the cream as it comes from the patrons is a matter of far greater importance than the incorporation of an excess of moisture, and it is the rock upon which our butter industry must be built if we are to take our proper and possible place among the dairy countries of the world. I am finding out that intelligent and courteous cream haulers can do an immense amount of good along this line, and I am also finding out that the richer the cream the better the quality.

My routes vary from 25 to 32 per cent. and I invariably find the richer cream the best in quality. It is difficult to get many farmers to believe that with a rich cream, clean skimming can be done with a separator. This brings me to speak of a large number of experiments along this line which were conducted at the Kingston Dairy School during the past two winters, and also experiments along another line which are of interest to users of cream separators. Two years ago we took six different makes of separators and put each machine through nine different experiments to determine the effect of speed on the richness of cream and the skimming efficiency of the different machines, and we almost invariably found that an increase of speed from five turns of the handle lower than the indicated proper speed to five or even ten above the indicated speed, gave us a much richer cream and a cleaner skimming. In some cases we had a difference of over 20 per cent. in the richness of the cream in the same run just by increasing the speed of the machine by ten revolutions of the crank, and then some patrons wonder why their cream test varies from time to time when they never change their cream screw. We also put through a large number of experiments last year to determine the effect on the richness of the cream and the efficiency of skimming by allowing the milk to cool before separating. These experiments were suggested to me by the invariable lowering of the tests in my creamery when the cold weather comes on in the fall. We took milk at 80°, and would run a portion through three machines, and then raise the temperature to 95° and put through the balance. In just 50 per cent. of our experiments we had an average decrease in the per cent. of fat of 4 per cent. at the lower temperature (80°), and a heavy loss in the skim-milk. The cream appeared thicker and richer as it came from the machines, but the fat was not there. Our widest range was 9 per cent. lower at 80° than at 95°. We all know that a great deal of milk is allowed to cool down before separating in cold weather. A large loss of fat is the result, and often a lower per cent. of fat in the cream. Some agents claim that they have the only machine that will skim milk clean at a low temperature, but that machine is not made yet, and we do not need it.

In connection with our creamery butter business I have a little to say about this much talked of whey butter. Mr. Mitchell has been conducting some experiments this fall to ascertain the cost of separating a given amount of whey and thus finding the cost of producing a pound of butter. He ran two power separators three hours each on two different occasions and ran through 36,600 lbs. of water, consuming 900 lbs. of soft coal screenings at $4 per ton or a cost of $1.80 for coal. Taking three lbs. of butter per 1,000 lbs. of whey, the cost for separating, for fuel alone, would be about 1½ cts. per lb. of butter recovered. This work has been supplemented since the opening of the school and starting of the cheese-making, by obtaining whey and from which several lots of butter have been made, which on the whole was excellent in quality. It is the intention of our Superintendent to have considerable experiment work done along this line during the present term.

The dairy industry, and more especially the butter part of it, is indebted to Mr. Mitchell for doing away with some of the difficulties in testing cream. It is well known among creamery men that it is difficult to get a clear reading of cream without the addition of water, and where the 18.0 c.c. pipette is used the cream bottles are not large enough to hold the proper amount of water, acid, and cream without great difficulty in mixing. Mr. Mitchell conceived the idea of a 9 c.c. pipette, and then doubling the reading. This worked well, but if there was an error made in reading the error was also doubled. To overcome this objection Mr. Mitchell has had cream bottles made with their graduation half the size of the old style but the size of the bulb remains the same. These work to perfection, as there is plenty of room for the contents to mix and the reading is taken without any doubling. The same amount of acid is used (17.6 c.c.) as a pipette of water is added to the cream. Futhermore, where this amount of water is used it not only washes all the cream out of the pipette but also prevents charring of the samples.

I have used these bottles, and I am of the opinion that creamery men will be well pleased if they discard the old style bottles and ask for the 9 c.c. pipette and bottles to correspond. They should not cost any more than the old style; in fact the cost of the first order of 6 dozen bottles from the Wagner Glass Works was only $2.50 per dozen, which is the regular selling price of the ordinary bottles, and as these bottles will not cost any more to make the selling price will undoubtedly be about the same.

Q.—What effect will the tightening of that screw have?

A.—That means the thickening of the cream. I must confess we do not change ours.

Q.—Do you ever have a difference in your test?

A.—We have never tested, but it appears that we have suffered because we did not. You perhaps are not losing anything by not changing your screw; but what I refer to is that the cream you get from your machine to-day might not test the same to-morrow, but you may get all the fat in your cream.

Q.—Will we get as good results if we separate the milk when it comes direct from the cow, as we do by warming the milk?

A.—Yes, I think you would.

Mr. SINGLETON: What is the best way to heat up after the cream has become cold?

Mr. STONEHOUSE: The best way is to put it in hot water, but the most convenient way is to set it on the stove.

Mr. GLENDENNING: We have found it satisfactory to take one of these ten pound honey cans that has no paint on, and fill it with boiling water and set the receiver in that.

Q.—What was your theory of the richer cream arriving at the factory in better condition?

Mr. STONEHOUSE: On account of there being less skimmed milk in the cream. We know that when we take a heavy cream and get a little skimmed milk in it, it is the skimmed milk that goes off, it is not the fat.

A MEMBER: Mr. Warden asked the question the other day about his not being able to get his cream to churn; he could not make butter on the farm.

Mr. STONEHOUSE: There are a great many factors that come in. As a usual thing the cream had too much milk in it and the temperature is not high enough. There are a great many people who have the idea that there is a certain churning temperature of cream regardless of any other conditions. The churning temperature may vary all the way from 48° up to 70°, and if you have not got the right temperature for your own specific cream you will then have trouble in churning. With a thin cream we have always got to have a higher churning temperature, and I have never yet seen a cream that would not churn if the temperature was high enough. I remember one time at Guelph that cream was sent in, and the farmer's wife said she could not churn it, and Miss Laura Rose put it up to 70°, and she had no difficulty in churning. It is possible that there may be one cow in a herd that would spoil the churning of the cream. Some cows if they have been milking ten months have milk that will not churn, and if that cream was mixed in it might prevent the whole cream from churning, and in that case it is well to keep out the milk from the cow that is affecting it in this way.

A MEMBER: I had trouble in getting the butter to come, and I stopped milking two of the cows, and then I had no trouble whatever. These cows had been milking eight or ten months.

A MEMBER: Do you think it makes any difference if you feed frozen feed to the cattle?

A.—I never had any experience with that.

Q.—Have you ever investigated the offending cows in order to ascertain why their milk will not churn?

A.—No; I cannot speak directly on that point. The two principal fats in butter become hard, especially in cows that have been milking a great while, and these fats will not unite together, but these fats have a melting point at about 140°, if you have a good proportion of the softer fat you could see the reason why you have to have a higher temperature to soften these fats so as to make them adhere.

Mr. ELLWOOD: Don't you think it would be well to mix a little of that fresh cream—would not that assist?

A.—That is all right with thin cream. It is never advisable to mix a thin cream with cream that is ready to churn.

Q.—What effect has acid on cream in the churning?

A.—With a thin cream we have always got to have a certain amount of acid, and our object in ripening cream is to give a little more flavor to the butter.

Q.—Do you think the keeping qualities of butter are as good if it is made from the sweet cream as if it is made from the cream that is ripened?

A.—I do not think there is very much difference if the quality of the cream is good. Prof. Dean has made experiments along this line at Guelph.

Senator DERBYSHIRE: Does butter want to be kept? Why don't you sell it and eat it up fresh? It is worth more money the first five days after it comes out of the churn than at any other time?

A.—Yes, I try to get my butter out of my hands within a week, because I have never seen a piece of butter that improved with keeping.

Mr. BARR: I agree with Mr. Stonehouse and Mr. Mitchell that dividing the sample in two is an improvement, but you are halving the sample, and you are only going half way towards the solution of testing cream, and instead of measuring with the pipette, I believe we should weigh every lot of cream we get in. I believe the men who have been sending poor cream and milk to our cheese factories and creameries have been getting the long end of the stick. We have not been giving the men who have been delivering the good cream and milk all the money they should get, and if you would weigh the cream each man would get his correct test, and I say we should recommend the weighing of every sample.

Mr. STONEHOUSE: Mr. Barr is right there. There is quite a little difference in the weight of cream testing 25 per cent., and cream testing 40 per cent., and the man who sends the richer cream is the loser no doubt. I allow a little on the pipette when I have a richer cream.

Mr. Barr: That is just why we should not do it that way. Mr. Stonehouse could not explain that so as to satisfy the patron. I say, let us have the right thing. In nearly all the States of the Union they are compelled to weigh the cream.

Prof. Pearsons: Here is one point where we are ahead of you.

HINTS TO PATRONS AND FACTORY MEN.

By J. A. Ruddick, Dairy Commissioner, Ottawa.

I have been confined to no particular subject this morning, and a few thoughts regarding the different sessions that have been held may perhaps be of some interest and provoke discussion. There has not been as much discussion as there might have been at this convention, but I think that this has been due partly to the fact that the audiences have been very large. It has been my experience that we have more discussion when the crowds are smaller. I think it is a good sign when in a purely cheese district you have been taking some interest in the question of butter making. I judge that from the way you have discussed the very excellent paper given by Mr. Stonehouse; and though you may never make a pound of butter in this county, you have taken a deep interest in the butter question, because it has a good deal to do with the question of supply and demand. I think those who are engaged in making cheese should remember that, after all, the great business of dairying is a question of milk. And those who make cheese should study to some extent the butter end of the business with the view of becoming familiar with the conditions which affect the competition; therefore, I think it is a wise thing that this Association should give some attention to the question of butter making. I think it is a good thing for the different districts to make either one thing or another. There are certain sections in this county that have a good reputation for cheese, and get more for their cheese than other sections, and they should stick to cheese and develop that end of the business to the highest possible perfection. In some parts of the world they consider that there is a very great difference in the milk of the county and of the different farms. We lose sight of this in our factory system. In England where all the cheese is made on the farm, there is a very great difference in the quality of the cheese from different farms, and they have never been able to quite determine why that is so. They have taken the cows and exchanged them, and yet they have not been able to determine why they could get superior cheese on certain farms. It is largely a question of flavor, and usually attributed to a question of soil of these localities. We lose sight of this fine distinction in our factory districts, where the milk is all put together, but it brings about a greater uniformity, that is why the cheese made under the factory system excels that made under the dairy system. While it is possible to make cheese on a single farm better than it is made in the factory, yet, we have greater uniformity where the factory system prevails. Some districts are adapted to the making of cheese, and others to the making of butter. The Eastern Townships, for some reason or other, are able to make a finer quality of butter on the whole. Taken one year with another, the relative prices of butter and cheese have been very nearly the same; otherwise there would be an over production of the one article, and it is that which regulates the price. When butter is materially higher than cheese, there is a great deal more butter made than cheese. The factories then turn the milk into butter instead of cheese, and that reduces the price by overtaking the demand. Some one remarked yesterday, that the markets of the world are available to the people of any country. We are now using butter made in New Zealand. With the increasing transportation facilities, there is not any chance for the demand exceeding the supply for any great length of time in any particular locality, because it can be brought from the ends of the world for a comparatively small cost. I think it is a wise thing for the dairymen of Eastern Ontario to stick pretty closely to the cheese-making branch of the industry. It saves a great deal on investment, if you avoid the double plant, and I think there is a very much better chance to develop the industry to a higher state of perfection when we stick closely to one line and specialize along that line.

My sympathies in this work have always been with the cheesemaker. No one knows the difficulties they have to contend with better than I do, and I must say that I think the man who gets the least out of the dairy business is the man who has made cheese and butter. I will go further than this, and say that I think the buttermaker has made greater advancement in his part of the business than any other man engaged in the dairy business—a great deal further advance than the man who owns the factory—and I think that is largely due to the system of instruction we have. It is the best organization in the world for the education of butter and cheesemakers. The instruction has been of the practical kind by actual demonstration, not only in the dairy school, but also by the men who visit these factories and the creameries. I think there has been too much talk; telling men how to produce better milk, and that they should do this and that. We all learn very much more by what we see than by what we hear, and the man who has an opportunity of seeing things done would learn a great deal more than the man who is simply hearing how things should be done; and if the work of instruction in connection with dairy work can be extended so as to give a more practical illustration, I think we would make a greater progress. That is why I believe the men who produce milk have not made as much progress as cheesemakers have. I believe the man who produced milk for the manufacture of cheese and butter in the country would do better if he paid more for the manufacture. I believe it is done too cheaply. I believe it would pay the man who produces the milk to be willing to give a slight advance, and then see that he gets value for his money. The man who produces the milk is the most responsible man in the whole business. There is no person in the county who has the same interest in the milk and its products until it finally reaches the consumer. I do not care if he sells it outright when it arrives at the factory; because the ultimate prices will affect the prices he can get for it at the factory.

You should never allow a patron to send milk to your factory if it has been rejected by another factory, because he will lower the standard of your factory. If we would understand our responsibilities in these matters half our trouble would cease at once. Factories should be properly constructed and provided with cool-curing rooms. The patrons would insist on having all these things if they properly understood the matter, and they would see that the management provided a first-class cheesemaker, and they would see that he got sufficient wages to stay there when he made a reputation for the factory. There is not a factory in this county but might increase the value of its product by building up a reputation for its cheese. You may not do it in any one or two years, it requires time to establish a good reputation on the markets of Great Britain. Begin at the fountain head, and have the producer of milk realize that he is interested in this thing right from the start to the finish. I look forward to the day when the milk producers in Canada will study this question more, and become more familiar with all the conditions which affect the value of their products. We do not want any inferior cheese made, even though someone does make up the difference in the price. I believe that the present system of instruction and inspection has had some effect in that direction because it is causing people to talk more about these things. (Applause.)

Mr. G. G. Publow, Chief Instructor: I would like to take this opportunity of pressing home some of the truths that have been given to the people during this convention. It is a great pleasure to me to be able to say that this has been the best dairy convention that we have ever held. I think the information that has been given here has been the best I have ever heard. What is the object of all this work we have been doing? Is it not to insure a good strong demand for the goods we have to offer. There should be the greatest sympathy between the producer and the cheesemaker. Never in the history of the work, since I have been engaged with it, has there been such a disposition shown by the people to meet on fair grounds the buyers and manufacturers that there has been this year. Never in the history of the trade have the farmers of this country shown a disposition to pay a fairer price to the laborer. I appeal to the cheesemakers of this country, and the factory men of this country, to draw your patrons closer to you. I hope to see the day when the cheese factories of this country will be centres of dairy education, and no man is in a better position to give his patrons the desired information than the cheesemaker. An effort is being made by the Department of Agriculture to send a speaker to all annual meetings of factories. We are endeavoring to have the instructors go there. The cheesemakers know what means are necessary, and I would say do not depend entirely upon the Government man. If there is a man amongst yourselves whom you know does well, why not take instructions from him. Meet together in your factories, if you are having any trouble, and your cheesemaker should be able to point out what man is sending the milk in in excellent condition; ask that man how he does it, and do not be afraid to imitate him. You pool your milk together, looking for the same returns. Owing to the conditions in the manufacturing of cheese, one man's milk may cause a loss of several hundred dollars. It is a mutual business, and every man is a factor in causing a loss. He should be in a better condition than the man who is handling it every day; you must get closer to him.

The laws of this country are very strict regarding the production of milk and place of manufacture, and the eyes of the people of this country are directed towards us, and they are expecting that we will see that the proper conditions exist in these places. I think it is well that the cheesemaker in every factory should make an effort to educate his people as to what is necessary to do. It is likely we will have to tighten the lines. There is no law that will compel a man to send his milk. Supposing I say to a man, "If you do not send your milk in a better condition we will have to prosecute you." He might say, "Well, I will not send any more milk." If there is a patron in your factory who falls away because he has been pressed to send milk in better condition, hold him for the price of manufacture. I think that is only fair to yourself, and it is likely we will have to press them if they hold out as they did last year, and it is well for you to understand that nothing has been asked, or will be asked, other than common decency. What we are asking for is clean, sweet, wholesome milk, clean utensils, and a place where it is manufactured kept in clean sanitary condition. Never in the history of the manufacture of dairy products in Eastern Ontario has the effort been put forth to have these places clean that there will be in 1908. (Applause.) I want the conditions surrounding the manufacturer of dairy products such that I can take any man from any country with pride and pleasure to see it. I do not care how cheaply they are constructed so long as they are clean. I appeal to the people of this country to see that the dairy buildings are built of the best building material. Our first-class makers are not being over-paid, but some of our makers are getting three times more than what they are worth. Less than twenty-five per cent. of the cheesemakers in the Province of Ontario are qualified to test milk, and make the very best cheese. Never will we get up to where we should, until we have these matters improved. Every man should be an expert. We must reach perfection if we are to get the highest prices.

Mr. Barr: A real bright young fellow said to me, "I would like to go to Kingston School this winter, but I have been at this factory for years and this has been one of the hardest years I have had. I have a wife and two children, and I have either got to go to the river or to the woods this winter in order to make money to keep my wife and children." Whose fault was that? I believe there are lots of cheesemakers in Eastern Ontario that have not money to go to Kingston. I am not saying it is the farmer's fault, but it is a condition that exists to-day in the dairy business. During the past season there was no section in Ontario or Quebec that stood up in the lime light in the trade in Montreal like Prince Edward County; because you have made such improvements in your curing-rooms. The trade was looking at Prince Edward County with very critical eyes, and if any cheese came from this county that was not quite up to the mark they were very severely criticised. You see what you got by getting up on top; if you are going to keep the reputation, you have got, you will have to keep forging ahead. There should be no excuses for not having ice on every farm in Prince Edward County. I had charge of the instruction work in Western Ontario for some years, and I thought I had a hard proposition in the West; but since I have come down to the East I want to tell you candidly, that I think I had a considerable snap to what Mr. Publow has in Eastern Ontario.

The Convention was then declared adjourned.

DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

ANNUAL MEETING.

The forty-first annual meeting of the Dairymen's Association of Western Ontario was held in the Opera House, Woodstock, on Wednesday and Thursday, January 15th and 16th, 1908.

There was a very large attendance at the meetings, showing that a deep interest is being taken in the dairying business in Western Ontario. As usual in connection with the annual meeting of the Association, a Dairy Exhibition was held, and for this purpose the commodious Market Building was used. There was a splendid exhibition of dairy products.

PRESIDENT'S ADDRESS.

BY JOHN MCQUAKER, OWEN SOUND.

As president of the Association, I am not going to harangue you with an address of considerable length this morning. I have incorporated what I have to say in the Directors' Report, which I shall read to you. I am to be pardoned, I think, if I express to you my appreciation of the honor you did me a year ago, in electing me as President for the year 1907. It is an honor to be President of an Association such as this, which stands for the advancement of the dairy industry of Western Ontario. I am also to be pardoned I think, for a word of appreciation of the position I hold, as presiding at the convention in the good city of Woodstock. The people of this district will readily grant that this is the very centre of the dairy industry of the Province of Ontario. There are other parties who would like to claim the supremacy, however, but it is not my intention to raise any discussion as to the merits or demerits of any particular section of the country as regards this industry.

I shall now be pleased to read to you the report of the Directors for the year 1907.

DIRECTORS' REPORT.

Permit us to welcome you cordially to-day to the forty-first Annual Convention of the Western Dairymen's Association, and to express the hope that you may not only be benefitted by the addresses and discussions of the several sessions, but that you may go home with a fresh enthusiasm to make the dairy industry the prominent one in the agriculture of Ontario. It is a source of general satisfaction that the Convention is being entertained by the good city of Woodstock in the very heart of one of the best dairying districts of Western Ontario. It is now some six years since the Convention met here, and it will be very interesting to review the progress of the dairy industry during these years, so that we may avoid the mistakes we have made in the past, and plan for larger and better things for the future.

A careful examination of the program which is now in your hands will, I think, convince everyone that every minute of the two days of this Convention will be full of good things for the interested cheese and butter men of the Association. We ask that you give your undivided attention to the men who have come to address you, and that you each do your part to make the Convention a complete success.

Your Directors wish here to place on record their regret at the resignation of Mr. George H. Barr, who for a number of years so ably filled the position of Secretary-Treasurer and Chief Instructor of the Western Dairymen's Association. We are, however, pleased with the promotion which has come to Mr. Barr. Your Board were extremely fortunate in having on our staff of instructors a man, well qualified to take up and carry on the work in a most satisfactory manner—Mr. Frank Herns—who, on the recommendation of your Board, was appointed by the Department of Agriculture to the position.

We are pleased to be able to call the attention of the members of this Association to the fact that the experience of the past season has been most encouraging to the patrons of the cheese factories and creameries, high prices prevailing. A steady progress is being made in the quality and finish of our cheese, and improvement is also shown in the quality of creamery butter in Western Ontario. A great percentage of our butter has been consumed at home this year. A large amount of money is being spent in improvements of cheese factories and creameries, their equipment, and surroundings, under the improved system of instruction and sanitary inspection, which the Association has been endeavoring to carry out with the support of the Department of Agriculture. During the past season the work of instruction in the factories and creameries has been continued with some changes. Every factory or creamery has been visited at least once, and almost all have had from four to six visits by the instructors. A full report of the instruction work will be submitted during the Convention. The charge formerly made for this work was withdrawn, the entire cost being borne by the Department in Toronto. We desire to express our appreciation of the interest of the Hon. Minister of Agriculture and his staff in the welfare of the dairying industry of Ontario, and to acknowledge the substantial financial assistance which the Government continues to give to the Association.

There have been spent this year in Western Ontario in factory improvements $35,882 on cheese factories, and $16,954 on creameries. Further particulars regarding the work of instruction will be found in the Chief Instructor's Report, which will be submitted to this Convention a little later.

Prospects for the future of the dairy business in Canada are very bright, and so long as we can furnish cheese and butter of satisfactory quality our dairy goods will continue to hold an important place in the markets of Great Britain. Your Directors have recognized the cheese and butter exhibits held in connection with the annual convention of this Association as one of its prominent educative features, and it is gratifying to note the interest manifested by the members in this competition.

In connection with this exhibit this year, instead of having a scoring contest, it was thought that perhaps better educative results might be obtained if one or more cheese were purchase by the Association and these cheese allowed to be examined by anyone who wished, and scored if desired. Thus everyone will have the chance to compare notes with the judges so far as these cheese are concerned.

There were three full Board meetings and six Executive meetings held during the year. A special officer was appointed by your Association to deal with cases of milk adulteration. This system has worked out very well and bids fair to materially discourage the growing tendency to deliver deteriorated milk at our cheese factories. A number of convictions have resulted, and we hope to have this feature of our work continued and the law so rigidly enforced that the dishonest man who tampers with the milk he supplies to the factory, thereby doing himself a wrong, as well as his fellow patron, may find it the wiser policy to do the right thing all round.

A committee was appointed by your directors to meet a Committee from the Eastern Association to consider the advisability of revising the dairy laws, particularly that portion relating to fines for delivering deteriorated milk. These fines were recommended to be raised. It is almost certain that the matter will be dealt with at the next session of the Legislature.

In conclusion, will you permit us to urge upon every member in attendance at this convention the educational value of this annual gathering, and to impress you with the wisdom of making the most of the opportunity for mutual advancement in dairy knowledge.

The convention ought to be an inspiration to us all for the future if we will only apply ourselves seriously to it. We need and ought to have all the enthusiasm we can gather to meet and help to overcome the difficulties which every dairyman is certain to encounter. We trust the year upon which we have just entered may be a very prosperous one to those engaged in dairying in this Dominion.

ADDRESSES OF WELCOME.

Mayor Sawtell: I am sure when the Association chose Woodstock for their Convention point, they did a wise thing. I do not think there is any convention that could be held in Woodstock that would be more interesting than the Dairy Association, because our farmers are very much interested in dairying, and I know they will be interested in this Convention. We are glad that you are here, and I would sav on behalf of the city and surrounding country, that we welcome you to our city.

Mr. **Gray**, President of the Board of Trade: The Mayor has spoken words of welcome on behalf of the 10,000 citizens of Woodstock, but it is my privilege to welcome you in the name of the business interests of the city.

A short time ago the Board of Trade made a census of the factories of the city and found that we have some 55 factories, employing some 1,200 men. We hope it will not be long before you come back again. We welcome you heartily.

Replies to the address of welcome were made as follows:

The **President**: On behalf of the dairymen of western Ontario I would say that we fully appreciate the hearty welcome which representatives of the good people of Woodstock have just tendered to us. I feel sure that the heartiness of our welcome to this good city of Woodstock will make us all feel extremely at home, even in the winter.

It is now my pleasure to call upon one who is quite well known to some of you. Oxford claims him as her son. He is an old Ingersoll boy, who has risen to prominence in connection with your dairy work. I refer to the Dairy Commissioner for Canada, Mr. J. A. Ruddick, who will speak to us on some phases of dairying abroad, illustrating his talk by lantern slides.

DAIRYING ABROAD.

By J. A. Ruddick, Dairy Commissioner, Ottawa.

It is always a pleasure to me to come back to the County of Oxford, and meet my old friends and acquaintances. I have travelled a good deal from one place to another since I left my home near Ingersoll nearly thirty years ago, and I never found it any disadvantage to me wherever I have been to be known as an Oxford boy.

I am going to tell you to-night of some of the things which I have seen in other countries where they compete with us in supplying Great Britain with butter and cheese. It is always a wise thing for any people engaged in any line of work or any particular trade to know what their competitors are doing, and I shall endeavor in as brief a way as possible to show you how, in some ways at least, our competitors are doing things, and there may be some inspiration and some instruction for us in this connection.

We cannot go abroad and copy everything we see blindly; we have to study our position. There are many lessons which can be learned by the Canadian dairy farmer and the Canadian cheese and butter maker from those engaged in this work in other lands.

Mr. Ruddick then favored the audience with a number of lantern views, and an address which was very interesting, showing the methods of making and shipping cheese and butter in different parts of the world, which was listened to with rapt attention by the large audience present.

ADDRESS.

By Donald Sutherland, M.P.P., Ingersoll.

I can assure you that I feel highly honored indeed to be asked to address a gathering of the dairymen of Western Ontario. I do not know of any better place for holding your Association meetings than right here in the centre of this County of Oxford, which is recognized as being the home of the dairy industry.

In looking over the official programme, I notice that back in 1868 the Association was formed, and for several years the President of this Association was a resident of the town of Ingersoll, and for many years the President of this Association was a resident of South Oxford.

I can speak to you as a practical farmer. You have been listening to practical men address you this afternoon and this evening, and the instruction they have given has been very great indeed.

The history of this industry is familiar to everyone present here tonight. The success attending your efforts has, in no small measure, been due to co-operation, and that is something that I think should engage the farmers of this country at the present time a little more than it does. We find that at the present time, we are surrounded by the most perfectly organized bodies it is possible to conceive of. The farmers of this country are the only class that are not organized to further their interests, and I think it is time that we were beginning to realize the importance of organization. I certainly do not find fault with any class or body for organizing; union is strength, and that being the case with every other class, the time has come when it must engage the attention of the farmers more than it has done in the past.

Dairying is recognized as the most profitable branch of agriculture. We have reached the time in the history of our country that is fraught with great things for this Province: yes, and for this Dominion. The old pioneer stage has been passed; the country is stripped of its rich wealth of timber that was the growth of centuries. We have got to adopt different methods from those pursued by our fathers. We have to follow some scientific methods. The men who came out here and did the pioneer work, those old empire builders who made the broad acres and cleared the farms, have passed away, and in hundreds of cases there is not now one of their descendants occupying the farms that they cleared with so much labor, and that is an unfortunate thing. I believe there is not enough sentiment connected with the youth of our country. The young men and women have gone into the cities to more congenial occupations, as they think, but I cannot conceive of any occupation that is a more desirable one than that of agriculture. I am satisfied, however, that we are not receiving fair remuneration for our labor.

I would like to refer to the pioneer work in the dairy industry that was done by the late Mr. Tillson of Tillsonburg. We have the records that were kept of the individual work of the cows in the herds, and I have taken the trouble to find some of the results obtained by Mr. Tillson of that herd he had in Tillsonburg.

You have had an excellent address on the growing of alfalfa. I saw alfalfa growing on his farm that was certainly a revelation to me. This was years ago, and he had it growing to perfection.

In 1898 Mr. Tillson had in his herd 55 cows. What do you suppose the average of that herd was in that year? 10,242 pounds per cow; the next year, 1899, it ran up to 10,933 pounds per cow; and one year he had a cow that produced as much as 20,132 pounds; and in four years the production of that one cow was 37 tons. I have not taken as much interest in dairying as a great many of you have, but I question whether this has ever been surpassed. I know he devoted years to the building up of the herd, and he had a herd that was a credit to him. And the pioneer work that was done by Mr. Tillson in Oxford should not be lost sight of. We should give such people all the credit to which they are entitled; they are doing a good valuable work. There is no man who can engage in business of that kind, and conduct it successfully, without having a great benefit upon his neighbors and upon the whole community, and I say all honor to those men who set such an example before the youth of the country.

ADDRESS.

By M. S. Schell, M.P., Woodstock.

I am sure it affords me a great deal of pleasure to be with you this evening. I came up from Ottawa on purpose that I might take part in your proceedings, and show my appreciation of the work that is being done by the Western Dairymen's Association. There is no Association that has accomplished so much good, or has done so much for the development and progress of Canadian agriculture and for the advancement of the material interests of our country, as has been done by the dairymen of both eastern and Western Ontario.

You have heard that the first Canadian Dairy Convention was held some 40 years ago, and as we contemplate what has been accomplished and the progress that has been made, we begin to appreciate the importance of this industry.

In 1868, when the first convention was held, the exports of cheese were $550,000; in 1880, they climbed up to $3,800,000; in 1890, $9,312,000; in 1900, we reached the magnificent sum of $19,856,000; in 1903, the increase was still marked, $24,712,000.

I am sure that 1903 has been the banner year in milk production; the largest flow of milk was realized during that year. In 1904, the receipts were nearly as much, but the prices being better, the money returns were $24,000,000; in 1905 there was quite a reduction, and the receipts were only $20,300,000; in 1906, the receipts were $24,433,000; in 1907, that is the year ending the 31st of last March, the receipts were $22,006,584; and this last year the exports are going to be lower than for a number of years. So far as the reports are to hand the exports of cheese would amount to about $20,000,000.

In 1895, the value of the export of butter was $694,000; in 1905, $5,122,156; in 1906, $7,075,539; in 1907, $4,011,609; and this year the exports of butter will be very low indeed.

It is well for us at a gathering of this kind to see whether there may not be some lessons for us from the experience of this past year. We want to profit, if possible, by our experience. We had a very late spring, the growth of pasture was late, and not very good; the summer was exceptionally dry, the fall was not as good as many falls. I think it behooves us, as farmers, to try, if possible, and see if we cannot provide so that when the pasture is not as good as it might be we will still have fodder for our cattle. I know from experience that ensilage will give as good results in winter feeding as in summer, and I believe that every farmer who goes into the dairy business should make it a point to have a well-constructed silo. It does not pay to allow your cows to go out on grass in a weakened condition. Invariably in this country, we have a shortage of pasture during July and August, and on into September. In 1895 we only exported some 500,000 pounds of butter. In 1900 we exported $3,000,000 or $4,000,000, and in 1903, $15,000,000 worth.

Taking these two industries of butter and cheese, the total exports amounted to the sum of $48,000,000; and then, in taking into account what we use in our homes, which would represent at least $50,000,000 more, we may say that this industry represents a money value to the people of this country of at least $100,000,000, and is one of the greatest sources of wealth we have in the whole Dominion. The two million cows that we have in the Dominion of Canada could be made to produce a good deal more than they do. The 1,152,000 cows we have in Ontario could be made to produce five or ten times more per head than they are doing. We heard a good deal about weeding out the poor cows that only give from two to three thousand pounds of milk. I believe the cow is being abused. There are a great many poor cows, but I can tell you there are more poor feeders. We must make the best of what we have, and if we would give more attention to the question of feeding, we would get great deal better results.

If we put the same amount of energy into our business as farmers the whole year round, we will attain a much higher position, and I would say to the cheese-makers, "Put your life and energy into your work." It is only according to the amount of soul and spirit and life and ambition and energy, coupled with intelligence and skill, that you will make a success in your calling.

Do not be satisfied with getting just what will pay; aim at being the best cheese-maker in the country. If you are giving good pay to the cheese-maker, and he does not make a good article, then make him get out of the business. We owe a duty to ourselves, and to the country at large; and if we are not true to ourselves we will fail in reaching that standard of excellence which is incumbent upon every man who goes into this business.

I thank you for the kind hearing you have given me, and I hope this convention will prove the best convention ever held in County of Oxford, and I hope you will get inspiration and ideas that you will go home and put into practice.

The PRESIDENT: I said this afternoon that the man behind the gun in connection with the dairy industry is the farmer, and that is true; but in connection with the work of the Association in carrying on the instruction and in the supervision of the instruction, and general work of the Dairymen's Association throughout the Province we are depending upon another source for the revenue that is necessary to carry on that work.

We have with us to-night the Minister of Agriculture for the Province of Ontario, who has been exceedingly good to the Dairymen's Association since he has taken office. He is a man who takes deep interest in agriculture. He is a practical agriculturist himself, and he will now speak to us. The Minister usually has something very definite to map out in the way of work for the future, and I have no doubt he has thought out carefully what his plans are for the future. I am not in a position to indicate what direction his address will take, but have much pleasure in introducing to you the Honorable Nelson Monteith.

ADDRESS.

BY HON. NELSON MONTEITH, MINISTER OF AGRICULTURE, TORONTO.

I can assure you that it is with a great deal of pleasure I find myself among the dairymen of Western Ontario, especially as it is our good fortune to meet in this good city of Woodstock, known as one of the industrial centres of this great Province; a city also that may well consider itself situated in the fruitful section of this old county of Oxford, which is a county that has, from an agricultural standpoint, a great claim upon the agriculturists of this Province. It has been the pioneer, I believe, in the introduction of dairying as we know it to-day. Not only that, but she has exemplified the value of dairying in maintaining a density of population in our rural area.

It is not my purpose to-night to speak to any great length, as it would be unkind of me should I inflict a long speech upon you. Therefore, since it is my good fortune to meet with you again, I desire to express the satisfaction I personally feel in the good work that has been accomplished along dairy lines during the past year by this Association. We are, as yet, somewhat in the experimental stage, and I suppose as long as we continue in this industry, requiring so much skill, we shall be in the experimental stage. There is much to learn, and I believe we are a people capable of learning much. A year ago, when I met with you, it was felt that something should be attempted in a more thorough instruction of the cheese-makers of this Province of Ontario. While the standard of excellence was admittedly high, it was still felt that we had not reached that high point of excellence that will permit of no further advance. It was felt that the quality of our goods produced might be improved, and one of the means whereby that improvement might take place was felt to be not only in more uniform instruction, but in inspection as well. But having an instinct of the feeling of the public, I felt that there was a possibility that some of the inspection might over-step the points of prudence. Judging from my own make-up, that it is far easier to lead than to drive, I felt possibly that this might be taken as an effort to drive the cheese-industry of the Province rather than to lead it. After talking over the situation with those identified with the industry, east and west, it was felt that in the best interests of this great industry—which, after all, is the great right arm of agriculture in Ontario—that an effort should be made to at least give a more thorough inspection and instruction, and we undertook to legislate with that in view, as will be seen by the legislation of the past session. Now, this legislation has met, I believe, with a reasonable degree of success; and to-day although we have had the conditions that make for a poor product during the past year, the general consensus of opinion from Montreal, our great port of shipment, is that during the past year the cheese product of this Province has been excellent, which is a great tribute to the makers and the methods they have followed during the past year, and the instruction they have received. (Applause.).

I believe we are safe in giving reasonable encouragement and support along dairy educational lines. It may surprise many of you who have given the matter but little thought, as to the vast sums that are being expended annually in urging better instruction and information along dairy lines in the maintenance of our schools for the teaching of our instructors. A considerable sum of money is expended for paying outright the men who visit the factories from time to time, and helping the makers to grapple with your difficulties, and see that the product from the farm is good, and that the maker has a fair show in the matter in getting a good quality of milk for the manufacturing.

The sum expended on these various lines in the Province of Ontario in the past year was in the neighbourhood of $66,000. This was a large sum, but I believe the money was well spent, and will justify the expenditure; and for that reason, and having the responsibility of standing between you and the people in this regard, I feel that you have upheld my hands and given value for the money expended. (Applause.) I say this by way of appreciation of the work of the instructors, and of those engaged in the varied lines of the dairy industry; because we are all a great corporation in this business, as we are in every other business, almost, in the country that touches agriculture. "No man liveth unto himself," and the man who produces the poor article, just so much lowers the standard of that high and noble calling, "agriculture." Therefore I say each one of us should aim and strive to maintain as far as in us lies the high reputation that we hold at the present time.

I believe it will be necessary in the near future—in the coming year—to still tighten the work of inspection and strengthen the lines of instruction so that we can go on to greater things in the future than in the past.

The other gentlemen who have spoken, Mr. Schell and Mr. Sutherland, have touched upon many lines upon which it is unnecessary for me to speak; but what we want in this business is the ability to produce cheaply and of a good quality, and to make a greater profit. I think I can safely say, in view of the high wages being paid, that higher prices are bound to rule for food products, and that should be an encouragement to us to see to it that we are there to profit by this higher range of prices. It is not possible for our people to crowd so largely to the urban centres without bringing about such a result. The higher range of prices will tend to bring the people back to the land, which, after all, makes for stability in our community and our country at large.

It was my privilege during the past year to visit the Mother Land, and to look into as much as a hurried visit would admit, their intensive methods of cultivation. I feel that in connection with this great calling of agriculture as time goes on, and our centres become more populous, we should be called upon to produce a greater variety of products for the maintenance of the wholesome, strong artisan class in this Province of Ontario. I went abroad with the expectation of finding much that would be of value to me in connection with the work of the Department, and I found in many portions of the old land, and on the Continent, some conditions that we might well copy. But, upon the whole, I find that agriculture is on as high a plane in regard to the skill put into it in this country as any place I visited. True, they are making their acreage yield more than we are in many districts in the old land, but for implements and other utensils with which we work, I find that the better class of farmers in this country are thoroughly up-to-date. They have possibly overdone it in the matter of "spreading themselves," as the saying goes—spreading themselves over a large number of acres—and I believe many of us would find greater profit in cultivating more intensely along the line suggested by Mr. Schell, and in the growing of fodder crops in a more intensive way. True, that would mean a change of our methods, and the employment of more labor, but I believe these are conditions which must come if we are to meet the necessity for intensive cultivation.

I trust the time is not far distant when the homes in this Province of Ontario will be a duplicate of the best conditions that it is possible to have; that we shall in our country homes have the privileges of the daily press, have our telephone system, and I believe you are largely developing it in this county of Oxford. With cheap power, we will have numerous radial railways to carry our products to the most distant of our Provincial markets, and when these conditions come about then our people, even though they have reached the high standard of citizenship at the present, will be more ready to dwell in the homes of their fathers. I trust that time is not far distant.

I wish to express, as a humble member of the Government, the appreciation we feel in connection with the good work carried on, not only by the staff employed, but also by the people in whose charge they have largely been put. Unless the producer values his responsibility, and acts up to the highest standard, the work of the instructors will be largely lost. It is true, not only of the men upon the farm, but of the women upon the farm, and I think it is unnecessary for me to make any remarks as to the necessity for cleanliness on the farm, because I believe the women of Ontario equal any other women in the world in this regard.

In order that everything in connection with this industry may be wholesome and sweet, so that our products may go abroad and meet with an ever-increasing consumption in the old land, it is necessary that we should exercise the greatest degree of cleanliness.

It is strange indeed to find that at the present time there are 150,000 less boxes in store in Montreal—150,000 less boxes on the English market of our cheese than a year ago—and these are the things that indicate that we are bound to have increased prices for our products in the coming year.

I wish you success, and I trust that those of you—and you are highly favored in this section—who have the opportunity will largely augment your herds and increase the product, and keep the standard up to the high level of the present and then a higher level in the future.

I thank you for giving me the privilege of again meeting with the men engaged in this business. I have nothing further to say than to pay a tribute to the ladies who have graced our gathering to-night. No business is going to flourish to its greatest extent without the friendship and interest of the fair sex. It stimulates us men to higher and nobler efforts when we feel that the women of the country, the best in the land, are looking approvingly upon our efforts. (Applause.)

The **Chairman**: I am sure it is a privilege for us to hear from the Minister words of appreciation to the way in which we have demonstrated the legislation which the Provincial Legislature passed last session. I am glad the Minister feels that at least good progress has been made, and satisfactory work has been done.

REPORT OF DAIRY HERD COMPETITION.

The secretary, Mr. **Frank Herns**, read the following report:

The Directors decided to again take advantage of the liberal donation of Messrs. Ryrie Bros., of Toronto, of a silver and bronze medal for Dairy Herd competition. The regulations were the same as last year except that instead of the medals being offered for the most money per cow, they were offered to the patron furnishing the most milk per cow to a cheese factory, and the most butter fat per cow at a creamery from April 1st to Oct. 31st, 1907, not less than eight cows in the herd, and the figures to be taken from the factory books and certified to by the secretary and maker.

No patrons of a creamery entered, therefore, the bronze medal was awarded to the patron sending the second highest amount of milk per cow to a cheese factory. Only eight patrons of cheese factories entered.

The silver medal was won by Mr. W. E. Thompson, of Woodstock, with an average amount of milk per cow of 8,020 lbs., and the bronze medal was won by Mr. Wm. Pearce, of Holbrook, with an average amount of milk per cow of 7,571½ lbs.

The following is a tabulated statement of the herds:

Owner of Herd.	No. of acres in farm.	Breed of cows.	No. of cows in herd.	Total lbs. of milk sent to factory.	Average lbs. of milk per cow.	Total money received	Average amount of money per cow.
						$ c.	$ c.
W. E. Thomson, Woodstock......	150	Holstein and Holstein grades	12	96,240	8,020	934 64	77 89
Wm. Pearce, Holbrook........	50	Grade Holstein....	8	60,572	7,572	585 02	73 13
Mason Bros., Tyrrell	280	Grade Holstein....	21	156,986	7,475	1,375 93	65 52
S. Cuthbert, Sweaburg.......	75	Grade Holstein....	15	102,161	6,810	967 14	67 47
M. Swance, Springford......	125	Holstein and Durham	12	79,380	6,615	730 63	60 89
J. W. Cornish, Harrietsville....	50	8 Grade Holstein. 1 Grade Ayrshire 1 Grade Durham and Holstein....	10	64,321	6,432	606 75	60 67
R. Gleason, Medina..	150	Grade Holstein....	24	133,408	5,559	1,314 64	54 77
R. S. Ballantyne, Atwood.........	....	....	21	188,878	5,661	....	....

DEVELOPING A PRIZE MILKING HERD.

By W. E. Thompson, Woodstock.

As I am the recipient of the prize given to the patron of any cheese factory sending the most milk per cow during a period of seven months, I have been called upon to give a short address.

Five years ago I started business for myself on the old homestead, known as "Leslie Farm," in the township of East Zorra. Being a man with limited means I had to start on a small scale, and grow as my profits permitted. I bought all the grade Holstein cows my father had, and three more at sales, making nine in all, which had made a reputation for themselves at the Innerkip factory, and which, as you see, has not been lost.

I have always used a pure-bred Holstein as a sire, raising only heifers from the best cows, and feeding them well while young. My herd is composed of five pure-bred Holstein cows and the balance good grades.

I have always taken a great interest in the questions pertaining to dairying, and attribute much of my success to the knowledge obtained from attending the Dairymen's Conventions and reading the different farm papers, and any information obtainable along dairy lines.

Dairymen of To-day. A man to be a successful dairyman of to-day must of necessity have a fair education, and I know of no better place to get such an education than at the Ontario Agricultural College. I regret very much not having been able to take a course along dairy lines in my younger days, as it would be very useful to me in my business.

Bookkeeping is very necessary on the farm to-day. A man should be able to tell at the end of the year where his greatest losses and profits have occurred, thus putting him in a better position for the next year's business. There are many minor points about dairying, such as testing the cows, paying for milk by butter fat, sterilizing the whey, use of separators, and how to ascertain the proportion of casein in milk, etc., all of which are of great importance to the farmer who is alive to his business.

One thing important in successful dairying is a good, comfortable, well lighted stable, as the cows are very sensitive to heat or sudden cold. My stables have stone foundations with plastered walls and cement floors, with plenty of light and fresh air. There is a complete water system throughout the stable, each pair of cattle having a basin to drink from, which is kept filled, being regulated by a float in the water box.

Good Cows and How to Get Them. Most of my present herd are young, and of our own raising, some of which trace back to my boyhood days. I am in a position to say that the very best cows I have were heifers raised from heavy milking dams. By using a pure-bred sire of a diary strain, and of a long line of heavy producing ancestry, what more can a man expect than to improve the herd, if the proper care and feed are given.

Last year a two-year old heifer gave 7,106 pounds of milk, testing 3.7 per cent. of fat, and a three year old gave 10,326 pounds of milk testing 3.6 per cent of fat, under ordinary care and feed. Another cow, twelve years old, gave 14,155 pounds of milk testing 3.8 per cent. of fat, and is still milking.

At our factory the milk is paid for according to test, which is the only way up to date, of receiving milk, and my average test for the seven months was 3.5 per cent. of fat.

I have been trying for the last three years to so weed out all my poor cows in order to get a herd of equal value, but it is only this past season that

I have been able to know the real value of each cow. Last spring I joined a Cow Testing Association at Spring Creek, which I feel assured will be a benefit to any dairy farmer. With a little time and care you may know just what each cow gives in milk and fat. A person must be careful to get the exact weight of each milking, and to take a proper sample, or all his time and trouble is of no avail.

The question of keeping records of cows is engaging widespread attention. No one can claim to be an up-to-date dairyman who does not keep individual records of his herd. No matter how well cows may be cared for there will be an improvement just as soon as a proper system of keeping records is adopted, and a new and increasing interest is created. The owner sees, as he never did previously, the wonderful capabilities of his good cows and the uselessness of his poor ones. He sees how responsive his cows are to the smallest influence, and delights in studying their individual characteristics, and once started he does not want to go back to his former methods. I would like to see more of our Zorra dairy farmers join in this very important work. We have a straight spring balance hung behind the cows, and it takes only a few seconds for each milker to hang his pail thereon and mark the amount on a sheet. Samples are taken three days each month, morning and evening. At the end of each month the box and sheet are taken to the factory and tested by a capable man sent for the purpose. Again we find that the milkers take renewed interest in the work. They milk cleaner, trying to get as much or more milk each successive milking, and are more careful as to the feeding and handling of the herd.

My herd numbers in all twenty-eight head, ten pure-bred Holsteins, and the balance Holstein grades. The largest number milked at any one time during the year was fourteen, including a two-year old heifer whose milk was used for family purposes. During the seven months of the contest I sent on an average the milk from twelve cows, which gave a total of 96,240 pounds of milk testing 3.5 per cent. of fat, making an average of 8,020 pounds per cow. Two of these cows freshened in October, 1906, two in January, 1907, five in March, and the balance in April and May. The total pounds of milk given by the fourteen cows for the whole season was 142,418, making an average of 10,172 pounds of milk per cow.

METHOD OF FEEDING. This is my method of feeding in winter: In the morning the first thing we do is to milk the cows; then the roots and meal are fed, after which the straw or hay. The water is always before them. At noon we give a feed of cut corn, in the evening, say five or half past, we again milk, and the roots and meal are again fed followed by straw or chaff. This diet is continued until about the first of March, when hay is fed in place of straw. The meal consists usually of a mixture of barley and oats. When necessary to supplement this, some bran is added, together with something stronger, such as low grade flour or ground wheat, which brings the mixture to about the same weight as the barley and oats. The milking cows receive of this about a gallon each, twice a day. I find that even yet my cows are not fed to their full capacity, as when given a feed of meal at noon it makes a considerable increase in the amount of milk. Cows give a greater return when freshened in the months of December, January, and February, and if well fed they will give nearly as much milk during the summer as those which freshen in April or May.

In the summer the cows are tied in the stable for milking, and if the flies are on them they are sprayed with a preparation put up by Dr. Williams. When the pasture is beginning to get dry and short we give one quart of meal or two quarts of wheat bran twice daily until green feed such as corn or roots may be used.

Q.—Did you feed corn ensilage?

A.—I feed cut corn. I have no silo; I wish I had.

Q.—Do you consider it would pay to feed wheat bran at present prices?

A.—Yes, I do; you get your value out of the bran in more ways than one.

Q.—That is, provided it is not adulterated at all?

A.—I cannot say that I have had any adulterated bran, so that I have had no experience.

A Member: The country is full of it.

Q.—Do I understand the speaker to say that he had only fourteen cows milking during the entire year?

A.—Yes.

Q.—Had you more than fourteen cows in the herd?

A.—I had not more than fourteen cows, the balance are young cattle. I have had as high as twenty.

Q.—How large is your farm?

A.—100 acres.

Q.—I thought you said you had 23 head of cattle?

A.—I have at present.

Q.—There were only twelve cows milking during the seven months?

A.—Yes.

A Member: How about the other two?

A.—Just there I might explain that matter. In the month of April I milked nine, in the month of May eleven, in the month of June thirteen, July thirteen, August thirteen, September thirteen, October twelve.

A Member: Did the same cows go on milking, or when one dropped off, you put another in its place?

A.—No, the same twelve.

Q.—You did not get this average from the same twelve cows, you had more than twelve cows?

Q.—You had less than twelve cows milking during the period?

A.—If you add up these figures it makes twelve cows.

Q.—Part of the season you were milking only nine cows?

A.—Yes.

Q.—That milk was from fourteen different cows?

A.—No.

Q. The same twelve cows gave it all?

A.—I claim I have fourteen cows in the herd. I had a two-year old heifer besides.

A Member: Is that the way the competition was carried on? You strike an average. I always considered you had to have so many to start with, and finish up with the same cows?

A.—I do not know about that, I am sure. If it would make it any clearer to you, I have this list here, just what each cow furnished.

A Member: It appears to me from the question, that you had one cow for a month or two, and then let her dry up, and commenced with another cow.

A.—That was not the case. I started with nine, and for four months there were thirteen milking without one dropping off.

A Member: You averaged the thirteen cows to balance up the nine, and called it twelve cows?

A.—Yes.

NOTES ON COW TESTING ASSOCIATIONS FOR 1907.

By Chas. F. Whitley, Dairy Division, Ottawa.

There was a marked increase in the work during 1907, there being 52 associations instead of 16 in 1906, 876 members in place of 297, while the number of cows increased from 3,750 to 9,160. Better than the mere growth numerically is the enhanced interest taken by the members in the work. The weighing of the milk has been more regular, the samples seem to have been more carefully taken, and have been sent in more promptly for testing, while the work, generally speaking, has been continued longer, so that more records for longer periods are available than last year. Further than this, there has been a greater disposition evinced on the part of the members to meet the men doing the testing so as to ask questions on all manner of subjects pertaining to dairying. This is an indication of what could easily be accomplished with most beneficial results, namely, to make the cheese factory or creamery a real centre of dairy education. One or two associations further, at the suggestion of the Department, arranged for an occasional meeting of the members to discuss the records and take steps for the improvement of their herds. This feature is one of great promise as "in the multitude of counsellors there is wisdom."

Probably the greatest advantage of records of dairy cows is the opportunity afforded for comparisons. One is naturally led to enquire what is the difference in yields in various districts, in the yield of herds in the same associations, but most important between individual cows in the same herds under the same management. This brings into prominent thought the ultimate aim of the work undertaken by members of cow testing associations, namely, a study of the individual cow with the object of developing strains of animals producing abundant quantities of good milk economically.

Taking the *district* question first, it may be noted as an example of the contrasts brought to light that the total production of 54 cows in one association in Victoria County during October was 19,330 lbs. milk, containing 751.9 lbs. butter fat. During the same period 106 cows in Oxford County gave 65,830 lbs. milk, 2,347 lbs. fat, or a better yield by seventy per cent. Many men in the former association are looking for the dual purpose cow; probably all members of the latter association aim at special purpose cows. In the one district nearly all the farmers leave the whole care of the cows to the women of the house, and if they can make anything out of the cows besides keeping the house in milk, cream and butter, they are satisfied. Some keep a scrub bull running with the herd, and do not know when the cows should freshen. The other is a real whole-hearted progressive, money making dairy district. Taking other records from the same two counties it is found that in the six months, May to October, 1907, the total production per cow stands at 2,724 lbs. milk and 99.2 lbs, fat in the one case, and 4,793 lbs. milk, 165.3 lbs. fat in the other. This shows even a greater difference than during the comparison of one month, namely 76 per cent. One moment's thought will indicate the tremendous possibilities for Victoria County if the 19,000 cows were 76 per cent. higher in their returns, than they are at present. Why should they not be?

There is possibly a difference in the adaptability of the districts to dairying, but there is certainly a more pronounced difference between the individuality of the owners of the herds. One might consider the personality of the farmer, his particular interest in dairying, whether indeed he possesses the prime requisite for success, a love for stock raising. Some are better adapted by nature for grain or fruit raising. A real affection for the dairy cow means better care of her, and consequently better returns financially.

Cows below the Average. Taking 8 months, April to November, 46 per cent. of all the cows recorded were 100 lbs. milk below the average every month. The average in May for all the cows tested in Ontario Associations was 764 lbs. milk, and 46 cows out of every 100 gave only 653 lbs. Similarly in August, the average yield was 638 lbs., and 46 per cent. gave only 529 lbs.

Taking the total number of milch cows in Ontario as 1,100,000, and then assuming that 46 per cent. of them could easily give 100 lbs. of milk *more* than they do at present, with milk at 90c per 100 lbs., the dairyman of this province could have *an extra income of three and a half million dollars*.

Please note this is by simply improving those *below the average*, which should not be difficult, and does not consider the immense possibilities involved in further improving the average of the good cows.

The differences between *herds in the same district* may now be considered for a moment; as they illustrate, possibly better than the above, the aptness and efficiency of one man's methods over another's in the application of intelligent, up-to-date business methods to the science and practice of dairying. In the dairy business to-day there is no room for shiftless, haphazard, "hit or miss" methods, the dairy herd has to be run as a commercial undertaking. Over and over again can be found instances of a small herd of ten cows producing just as much as twenty. Such contrasts are in herds in associations in Ontario, Quebec and British Columbia, indicating that there is room for little short of a perfect revolution in many localities. Let the records speak to the question for a moment. Nine cows in one herd give 265 lbs. fat, while in another herd in the same association eighteen cows give only 260 lbs. during one month. Again, 10 cows in one herd yield 9,550 lbs. milk, while 16 in another give only 7,000 lbs. This is a difference not of 76 per cent. but actually 118 per cent.

Touching the advantages of providing soiling crops, and the gain from feeding liberally, two herds in an association near Peterboro' afford a noteworthy contrast. One man who has fed chop all summer, chiefly oats and peas, obtained from his 7 cows an average yield for July August, September and October of 2,943 lbs. milk, 101.8 lbs. fat. A neighbor who this year, the first for many seasons, has not given any extra feed and says, "he is ashamed of his weights," get from his herd of 16 cows an average of only 2,230 lbs. milk, 78.7 lbs. fat. Had his cows been as productive as those in the other herd, he would have realized over 11,000 lbs. milk more than he did. With milk at 90c per hundred this would mean another $102 additional income in four months.

The next point of contrast is that between *cows in the same herd*. This individuality of animals is so strongly marked that only by diligent study and most careful observation can one hope to determine the most profitable cows for selection as the foundation stock of the herd. The very fact that in any breed there are so many departures from the characteristics and particular type that may be expected, the difference in the animals' ability to use feed, their variation in yield of milk and fat under similar conditions, their persistency in milking, all emphasize the tremendous importance of continuous investigation, unceasing and painstaking vigilance.

To illustrate some of these points, one does not usually expect to find a high fat content in Holstein milk. Here and there have been noticed this season some individuals of this breed testing over 4.0 per cent. fat. Are there many more to be discovered? Why should we rest content with so many cows testing only 2.5, 2.2 and even 2? Is it fair to other patrons at the cheese factory to let the burden of making up the milk to a decent standard of quality as regards fat, rest on their better cows?

There is certainly virtue in inherited tendencies. The transmission of dairy quality is possible; judicious selection aims at this. Heavy milking ancestry is a very live factor in the capabilities of animals of the present generation. A twelve year old grade, calved October, 1907, gave in the eight months, January to October, 1907, over 8,360 lbs. milk testing 3.8 every month. She has had no special treatment, but comes of good milking stock. Selection pays.. Blood will tell.

It has been stated that if the shrinkage per month in milk yield for the first six months is not over 10 per cent. of the previous month it is not abnormal. Very few indeed of the animals we have on record show as little as that. Some few go 13 to 16 per cent., but a very great many have a shrinkage of 20, 30 and even 35 per cent. There is certainly room for improvement at this point. One cow was noticed giving in three consecutive months 930, 434 and 238 lbs. milk. This is a shrinkage of 53 and 45 per cent. In one herd are found cows calving in spring giving only 500 lbs. milk in September, and others calving the same time that in September were still giving 900, 1,000 and 1,100. These are the animals to select and breed from.

The evident preference of the cow for methodical habits has been vigorously commented on by some of our members. Her objection to a change of milkers is very apparent. The establishment of a perfect sympathy and mutual understanding between "bossy" and the milker, and not only that, but the regularity as to the hour of milking is insisted on by our best men, who find that careful attention to these details pays, and pays well. Couple this attention with a study of the feed problem and we have an insight into the radically different returns from some herds in the Brockville association. During five months one lot of cows in the hands of a careful dairyman averaged 4,194 lbs. milk each, but another lot yielded only 2,727 lbs. each. If the earning capacity of the latter had been equal to that of the former they would have given 16,130 lbs. of milk more than they did in the five months.

In this age of fixing individual responsibility, the real student of cows seeks for those returning maximum profit. Taking it for granted that it costs about $30 to feed a cow, are we to take that as the total cost of maintenance? Surely there are other expenses. These may be classed as interest on the value of the cow; decline in value which charge provides for purchase of successor; interest and taxes on the necessary buildings, and cost of caring for the cow. The sire has to be maintained, the cost of which is offset by the value of the calves raised; and the manure should be credited. These charges will vary, but looking through some Ohio records it is found that $21 is taken as the average in dairy sections. Taking these figures as a basis for comparison and applying them to two cows in a Quebec herd, we arrive at this conclusion. A good cow producing 350 lbs. fat, and 7,900 lbs. skim milk, has a total value of product of $99.55. Less feed and these other expenses, the net profit is $48.55. An average cow in the same herd producing 205 lbs. fat, and 3,700 skim milk has a total value of product of $56.85. Deducting feed and the charge for other expenses, the net profit is but $5.85. On this footing one cow gives 8 3/10 times as much profit as the other. Now to obtain $1,000 net profit would necessitate only 20 of the one kind, but *171 cows* of the other kind.

The work of cow testing associations enables these forcible comparisons to be made, and is a powerful argument for their formation.

A Member: Is this comparison always between two cows in the same herd?

Mr. Whitley: Yes.

A Member: All fed alike?

A.—Yes, with just that slight difference, I intimated. That man is a particularly careful feeder, and he is always just crowding them. If he thinks one cow will do better with extra feed, he gives it. There would be a slight difference in the case of the feeding, but not very much.

Mr. J. A. Ruddick: I want to say a word or two on this subject before we leave it. I am sure you have listened with pleasure and interest to what Mr. Whitley had to say in connection with the work we have been trying to do in the matter of improving the herds throughout Canada by means of these Cow Testing Associations. I made a little calculation since Mr. Thompson spoke in connection with what Mr. Whitley has said, and roughly it is this: If all the cows of all the herds in Canada were brought up to the standard of Mr. Thompson's herd it would increase the annual value of the dairy produce in this country by $80,000,000. There are about 2,000,000 cows in Canada; there were last summer, there are more now. Those cows did not average 4,000 pounds of milk each per year. If we allow the milk at one dollar per hundred, that is $40 per cow, and forty times 2,000,000 is 80,000,000. I believe it is possible to make a very large increase, and if we only increase the annual productions by twenty-five per cent., it would amount to a very large sum of money each year. If we reach the average of Mr. Thompson's, herd we would be very little better than the average of the cows in Denmark or Holland.

It was my good fortune to visit Holland last summer, and I made some inquiries as to the production of milk. Dairying is the national industry in Holland, and they depend very largely on their sale of butter and cheese for their revenue on the farm. I would like to give you a few figures in that connection.

Holland is a very small country, only about 12,000 and some odd square miles, about equal to the area of what we call Western Ontario. They have less than 1,000,000 cows, and yet after feeding five million people, they exported $27,000,000 worth of butter and cheese last year, nearly as much as Canada exported. We think we are a good dairying country, but we are only beginning in this business, and if you can go over and visit these Dutch farmers you will find that they are leading us a long way in the production of milk. We have made great progress in this country in the last two years; our butter-makers have made great advances, and I do not think there are any cheese or butter-makers anywhere in the world that have studied the science underlying the work they are engaged in as cheese and butter-makers in Canada; but we do not seem to make the same progress along other lines as these other countries have. Here is a territory about the size of Western Ontario having a million cows and exporting nearly as much as we did with our 2,000,000 cows and the actual value was $27,000,000 last year.

A Member: They did not eat any.

A.—That is a mistake. They do eat a very large quantity, and they have about as many people to eat it as we have in this country, and their production of milk is easily over double as much as ours.

Now let me give you the figures from one creamery. I know a creamery in the Province of Friesland where they have 1,150 cows supplying milk to that creamery, and the average of milk per cow is 8,460 pounds—for the whole creamery, not from the one herd. I have a record of one cow in the Province of Eleda. She gave twenty-one thousand, five hundred and twenty nine pounds in 365 days. Of course we have to take into consideration that the pastures of Holland are probably not equalled by any other country in the world. The greater part of the country is on a very low level beneath the level of the sea and the rain fall is pumped out over the dykes and the pastures are always in a good condition. They are very rich land and they seem to be able to keep a very large stock on a given area. I have seen as much as a cow to an acre. By the way, the Dutch people say we have no right to call these cows Holsteins, they are Dutch. They claim they are pure-bred Dutch cattle. I saw a farm of a hundred and five acres, and they had thirty-five cows producing a large quantity of milk. There were eight heifers, twenty-five calves, two horses, and twenty-five ewes on a hundred acres, and all the feed is produced on the hundred acres, except the meal which is fed in the winter time.

The members of the Cow Testing Association will be asked to contribute a small portion to the cost of the testing, and the charge is twenty-five cents a cow or a minimum of a dollar per herd.

I found quite a number, having received these circulars, were asked as to whether they would continue, and they said they thought not. One man said, "I will have exactly the same herd in 1908 as I had in 1907, and I do not see any reason for testing the herd for two years in succession." The mere fact in testing the herd is not going to do any good. It is what we do by following this work up systematically that will bring any results. Another man said: "I found on testing my cows they ran evenly." I looked at that man's record, and found in five months there was a difference of 1,000 pounds in a cow, and yet he thought he had a uniform herd. We propose wherever an Association of twenty or more farmers who will join together, the Department will continue to do the testing, and we ask the members of the Association to make that contribution during another year. The organizations are being made all over the country during the present time. I want to make this further announcement: If the cheese factories and the creameries would take it up, and where any cheese-maker will undertake to do the testing, the Department will pay five cents per test, and furnish all the blank forms necessary for doing the work. In that case there will be no charge unless the cheese-maker wants to make it to the members of the Association. I find that a number of the cheese-makers have agreed to do that, and I think it is a very good arrangement indeed. The factories are undertaking to do this work because it is in their interest. They are dividing their attention because of the increase of the production of milk. If they would do that instead of trying to take patrons away from the neighboring factories, it would be much better. I do not make that offer unreservedly, because I would like you to know that the cheese-maker was competent to make the test.

Q.—Can you compare Denmark with Ontario?

A.—No, I would not. They do some things very much better than we do.

Q.—How many cows have they got on that one hundred acres?

A.—The one hundred acres I spoke of was not in Denmark; it was in Holland, and they certainly have more labor.

Q.—There are twenty girls on each farm working?

A.—I am not making any comparison. You are making the comparison. I am only telling you the facts as I found them, and you are making your own comparison.

Mr. A. Groh: I know of a herd that for nine years had the milk weighed twice a day, and never in these nine years was there an expression heard that they would quit weighing. Not once in the nine years has there been a failure in weighing the milk. Those that become concerned about it are not worrying. They only worry whose heart is not in it. If you were to weigh every day and all the year around, you would have a double benefit, because you also want the scales in the feed room. Use your scales on the milk to show you what your feed is doing, and then you know just as your scales go up and down, the why and wherefore, and what to expect. Weighing will keep you in touch on the two hands of feed and production. I say, weigh your milk, and weigh is regularly. (Applause.)

FARM MANAGEMENT FROM THE DAIRYMAN'S STANDPOINT.

By J. H. Grisdale, Ottawa.

I want in the beginning to say that after many years' experience I must support very strongly the work Mr. Whitley has been doing to get you to test your cows, and I want you to pay special attention to the point made by the gentleman just in front of me, who got up and emphasized the importance of weighing the milk every day and twice a day. I think it is of very great value to know what your cows are doing in a general kind of way, which information you can gain by weighing three or four times a month. There is no greater help to a man who is anxious to develop and get the most out of his herd than this weighing day by day.

Mr. Ruddick said something about increasing our output, and compared what we are doing in this vast country with the output from a somewhat smaller population, numerically, in Holland. What I want to emphasize to-day is that we are not getting returns from our lands, and I want to discuss with you and suggest to you some ways in which we can increase the returns from our dairy farms.

If you will consider for a few moments what the average farmer in Ontario or any county, gets to-day and what he should get you will see that there is great room for improvement. I have been looking into statistics some few years on this subject, and I find that the average Canadian farmer who has 100 acres of land, most of it, or a good portion of it, arable, gets in the neighborhood of $600 or $700 revenue from it. There are not many farmers who get as small a revenue as that and expect to live on it; but there are many farmers with poor land who have a small farm and till it extra well and get larger returns. But on the average that is what the farmer is getting. Now, I maintain that is quite inadequate, and that is the first point I want to bring to your attention—the possibilities of farming and the fact that we are not living up to our privileges; we are not getting out of our farms what we ought to. What is the cause of this? I think I am right in saying that it is due to the method of farming we are following—due in a large part to our disinclination to employ more help to do more work on our farms, and in the second place, to our disinclination to follow any fixed line of farming, and to go about it in a good business way.

There are tremendous possibilities here. Let me illustrate first by giving you a few figures which I gathered together a year or so ago when I wanted to know what was being taken off our average farms in Ontario and in Quebec. I accordingly travelled around some and got considerable data here and there and I will give you the result.

In the first place let us take the farm where as little labor as possible is employed. I visited a number of townships not very far from here, some of the very best land that can be found in this world—no better land lies out of doors than I saw, and I have seen the land in many parts of the world—and yet in the Township of Lobo I found farms, thousands of acres, hundreds and hundreds of farms, where all the land, or practically all of it, was in grass and handled by a few contractors or speculators who were buying cattle and putting them there to pasture and selling them off in the fall. Those men tell me that they can count on running anywhere from 25 to 30 head on 100 acres. The speculators did not tell me, but the farmers told me that those men made about enough to pay rent and sometimes a little more; sometimes they had a fair profit and sometimes they had a mighty small one. That is, the revenue from such a farm would be in the neighborhood of three or four hundred dollars, or say $2.50 an acre.

Then I visited some other farms where there was nothing but grain or corn. They were good farms and they were handled just for the produce of the soil, no cattle kept, or at least just as few as possibly could be kept in order to supply the house. On this farm lived the farmer, sometimes a boy, and if not a boy then a man was hired and the farmer lived alone in the winter, and I found the average returns from that farm around $700 to $1,000 from the raw products, selling grain, hay, clover seed, and so on. Once in a while we would find a man who would do better, and just as often we would find a man who did not do as well, and the farms were going back. Of course if I had taken the year 1907 the revenues would be greater.

On that farm where the revenue was about $8 an acre, the labor employed was equal to a man and a half—one man the year round and one in the summer. Then I visited some other farms where they grew crops all summer, pastured a few cattle and took in a lot of steers to feed in the winter. Of some such farms I hav remarkably good returns. On one farm, where the man employed two men all summer, and one man in the winter, he had a revenue of from $1,200 to $1,500. You see there for two men and a half employed he had a revenue of from $1,200 to $1,500 on a hundred acres.

Then I visited another farm where a few pure-bred cattle were kept, and a few horses and steers and they were making anywhere from $1,800 to $2,400 a year.

There was another farm where they were dairying, and this seemed to be the top notch in the way of revenue. They were getting around $4,000 from one hundred acres. On this farm they were employing four men and a half; that is, four men the year round and an extra man in the summer. They kept a large number of cattle and swine and the revenue, one year at least, was $4,200 and some odd dollars, sometimes it came up as high as $4,500. Now this looks like a pretty good thing that a man should get from $4,000 to $4,500 from his farm, but it can be surpassed. Mr. Ruddick has given you an example of what has been done in Holland. Some of you are probably familiar with the man in Philadelphia who bought a little farm and found he could not keep 2 cows and a horse. In the course of a few years he was keeping 30 head of cattle and 2 horses and a couple of men and a boy on this 15 acres. It is not just a story that you hear, but it is corroborated and proven over and over again and has been investigated very carefully by men who were sent there particularly to look into this matter. You can, then, see the possibilities, and we are not living up to these possibilities in Canada. In this Canada of ours we are falling away behind this and we ought to be doing better. You say we cannot get the men. I believe we can if we would undertake to keep them the year around. I am not so familiar with your conditions in this county as I would like to be, but I know in our own district where the men are kept the year around, there is comparatively little trouble in holding men; but where a man keeps his employees only six months, he has a great hunt to get a man to work for the summer and he has to pay high wages. Of course you must expect to pay him good wages, and it is better to keep a man of that kind because he is cheaper than where you have a green man who knows nothing about it. If you will look at the figures I am giving you you will see that the whole success of these operations depends upon the amount of labor. Where there is only one-third of a man the revenue was $2 or $3 per acre; a man and a half, $7 or $8; two men and a half, $14 to $15; three men brought it up to $18 to $24; four or five men, $24; and on this little farm the number of men employed was equal to eighteen on 100 acres, and if you will figure that out you will find that every man left a good margin of profit to the man who was able to handle them.

I was very much struck by the question asked by a man in the gallery who wanted to know if it was true that in Denmark they had a whole lot of girls working on the farms. It is true. We do not have to ask our girls to work in our dairy. We have a country that is good enough to let the women stay in the house and I am proud to live in such a country. But let me say that every man who works here can make good wages, and for every man you have working on the farm you can make a good profit. I am confident every farm will pay in this country, because the average is going up, and we are going to see great improvements in the near future. Our returns are increasing; in fact we have to increase or we cannot live. Why do we get such small returns—because, we do not keep enough cattle or men. If you keep men you have to furnish them with employment, and I think the chief reason why our farms are not giving us returns is that we do not keep enough cattle on them. We are using too much land. In many cases we are land poor. A man gets a farm of 100 acres, and he sees another 100 acres near him that he has a chance of buying, and he says "If I can get that I will have 200 acres;" and he immediately sets to work and buys it; and instead of handling the 100 acres he had in a proper way, and making good returns, he handles the 200 acres badly. It is not necessary to have a big farm to make a good revenue. Take the farm where they make $4,000 a year. I can give you an example of a farm in Dundas county which consists of 120 acres, and where the farmer some few years ago was putting away $2,000 a year off that 120 acre farm. Now, you see, there was a good margin of profit there. He kept his family, paid his hired men and put away $2,000 a year. It is not absolutely necessary to have a big farm, if you will handle a small farm to the greatest advantage. Our land is not giving one-half the returns it ought to give. In the first place it is not sufficiently worked, and in the second place we do not keep enough cattle and we do not follow any system.

Mr. Ruddick mentioned a case where a Holland farmer had some 35 head of cattle, and a number of heifers and horses, and a large number of goats—nearly one head per acre. It is quite possible to keep one head per acre. I am not going to say that we ought all to keep one head of live stock per acre, but we ought to have that as an ideal. That is what can be done, and we should say to ourselves: "How near can I get to it?" We should not try to do something that is wonderful or altogether unusual.

On the Experimental Farm at Ottawa some years ago we took 40 acres of it and tried to see how many cattle could be kept on it. Everything that was produced for them was produced on the 40 acres, and we found we were able to keep 28 head of cattle, and I think one year we kept 29 head. At the present time we have at the Experimental Farm 200 acres, and we have 180 head of cattle and horses and 30 sheep, and a great many pigs. We do not buy any rough food, but we buy meal; but, leaving the pigs out, we do not buy any meal. We grow enough for 160 head of cattle, and in order to do that you must utilize every acre to the best advantage, and how to do that is what I want to bring to your special attention to-day. How can we increase the productiveness of our land?

In the first place, we must try to grow crops which are suitable for our purpose. I am talking to-day to dairy farmers, but practically the same thing will follow in the case of a beef farmer. We should grow crops such as roots or corn. I say preferably corn. I think roots are somewhat better for cattle than corn, although on some experiments last year we found practically no difference. Corn contains more dry matter than roots, but there is very little difference between the two. You can get almost as many tons of corn per acre as of roots and it is cheaper to grow corn, because, the labor is less. There is not so much stooping, and all the work in connection with the corn can be done by horse labor, and it is not so hard to get men competent to handle it. I would be the last one to advise a farmer to give up roots and go into growing corn; the combination of the two is the best. You should also grow plenty of clover. You can grow timothy for your horses; but if you make your clover hay well there is nothing better than that for horses unless you want to speed them. I do not know anything that will beat clover for working horses. Grow grains that are suitable for your farm. I think the principal grains are oats, peas, and barley. Wheat might be grown to a small extent, but the man who grows wheat to sell makes a mistake. Let those chaps in the west grow the wheat. During the last year or two I visited a number of farms in Manitoba where they have been growing wheat for a number of years and they are sick of it. They have not the opportunity of bringing up their fields, and some of them are wishing they had gone into live stock some time ago. The less wheat we grow the better for our general prosperity. Growing a lot of crops and feeding them at the wrong time is just as bad as not growing them at all.

I heard a gentleman in the audience saying something about the difficulty of working hard all day and going in late at night and milking his cows; and that is where the average dairy farmer makes his mistake. Keeping your cows ought to be your first object and not the last. The man who says his cows are a chore is not a dairy farmer. He is like a woman who is keeping hens, and he will not make a success of dairy farming. If we are going to be dairy farmers the dairy cow should take precedence. True, you have to grow crops, but you must utilize that feed to advantage or you are wasting your energy and your effort, and you are not going to make the income you should. If you are going to handle the dairy cow to advantage in this country where summer dairying is the principal business, you must take good care of the cattle in the summer. It is absolutely necessary that summer feeding be properly looked after. We are, all of us, too keen to get enough food put by for the winter, the fall, and the spring, and we neglect the cattle in the summer. Every farmer who is going to make a success of dairying must provide for handling his cattle and feeding them properly during the summer months, and any scheme of handling a farm for dairying purposes, into which summer care does not enter is sure to prove unsatisfactory and give small returns. You should grow enough corn so that you can fill your silo with feed and have enough to feed them in the summer. I believe there is nothing like corn, and the man who is dairying and has no silo is making a big mistake. I would not handle a dairy farm for a week without planning to have a silo put up right away. I never was so much struck with the importance of that as when I undertook to manage a little farm some few miles away from Ottawa on which there was no silo. It had been handled two or three years without a silo, and then a mighty resolve was made to draw in some of the cash that could be got together and put up a silo, and no investment made on the farm gave such returns; it had a wonderful effect. Just think for yourself all the trouble you have going out with a stone boat and chopping those stooks of corn out from the ice and drawing them in to the cattle. We were watching this operation as we came along on the train; a man cutting the corn out from the ice and drawing it into the cattle.

I know a few of my neighbors have strong opinions on this subject. I would advise you to save up a few dollars, and get enough to make the first payment on your silo. There is no one thing that a dairy farmer can do that will be of greater advantage to him than to run his farm in a way to have enough silage to have it all the year around; and if you cannot do that lay out your farm so that you will have an area in which you can grow feed for your cattle in the summer. I have a rough sketch of what may be called an ideal division of a dairy farm.

[The speaker here described his system of rotation of crops as given in the report of the Eastern Association under this cover.]

There are several other rotations which might be considered, but I do not know of any that will give better results than the four year rotation. Where the land is left two years in grain and three years in hay or pasture it gives very good results. Mr. R. Ness of Howick, Que., follows that rotation, still, he does not get the returns that he might. One objection which I have heard given is that corn will not grow on heavy land. That is all nonsense. The best crop of corn I ever saw was on a heavy clay field. The only condition necessary is that you get humus into it—some vegetable matter into it by growing clover or some green crop. Get it opened up and then have the surface water carried away by tile draining

Mr. Ness has a heavy blue clay and he never has failed in his corn. We have some land of that description at the Experimental Farm, Ottawa, and we never have a failure where the land is properly drained. Just as soon as you get the surface water off it is all right. I do not want you to think this is all idealistic, and not possible of being put into practice. There is not a farmer who cannot put this into operation. If you cannot see your way clear to put your farm into four fields, follow the rotation of the fields that you have; keep track of the returns and see the advantage. I know a number of farmers who are following that four year rotation with success. I want to get after the fellows who are not giving their farms a fair show. They are working some parts of their farms to death, and other parts they are overfeeding, and by that they are getting very unsatisfactory returns.

Q.—What kind of manure do you put on?

A.—Green manure every time. We find that a ton of green manure gives just as good results as a ton of rotted manure.

Q.—Do you draw it out in the winter?

A.—Draw it out as we make it. We spread it as long as the snow is not too deep. When we are not sure where we are spreading it we stop.

Q.—You do not use the spreader?

A.—We do as long as we can use it. We have more snow than you have, and we cannot run it in the deep snow.

A MEMBER: The way we do we draw out once a week and then pile it up. We spread so much, and then we put a little pile so that we will know where we stopped spreading.

Q.—Would it pay to put it in a heap in the field, and then use the manure spreader in the spring?

A.—If your land is uniform in character so that you cannot get on to any one part sooner than the rest, and you have lots of horse power, that is all right; but where you have a farm that has some high land that you can get on earlier than the rest, I think it would pay to spread the manure in the winter, so that you could go on with your plowing the first thing in the spring.

Q.—Do you work that spreader yourself?

A.—I can. I have done it; but they do not pay me at the Agricultural Farm for using the manure spreader.

Q.—Do you plow your corn land after you take off the corn?

A.—I run the gang plow over it and turn it usually. I just want to get these stalks covered. In the case of a root crop we plow it. If I could pasture the crops off I do not know that I would plow it. You can go over it quickly with a broad two-furrow gang plow, and one plowing is equal to three or four harrowings.

Q.—Did I understand you to say you plowed down 22 inches of clover or timothy?

A.—Clover.

Q.—What kind of clover do you grow?

A.—Alsike, and red clover. We count on about 25 per cent. of red clover in our hay the second year.

Q.—What about lucerne?

A.—I am not going to talk on that subject; there is a man here who is an enthusiast on it.

A MEMBER: What about that man who made $2,000 on his farm every year. I want to know where he lives?

A.—The man who gave me that information was a reliable man.

Q.—I want to see that man. I cannot clear that, and I have 600 acres.

MR. GRISDALE: How many cattle do you keep on these 600 acres?

A.—More than profitable sometimes.

MR. GRISDALE: That is not an answer.

A.—I have had 150 sheep and from 80 to 75 cattle. I have had that for 40 years.

MR. GRISDALE: That is about 15 head of cattle to the 100 acres, and the man I mentioned had 50 on one hundred acres. His name is J. Smith, of Chesterville, Ont.

A MEMBER: How would plowing twice do?

A.—I would rather not plow twice. Plow early and work the land well and then ridge it up with a double mould board; that is better than plowing the second time. We have tried that side by side with fall plowing and found that we had anywhere from one-half to two-thirds of an increase.

Q.—Do you advocate ridging in the fall?

A.—I have tried it, but I do not like it.

Q.—Do you find it much trouble to work down these ridges in the spring?

A.—No. If you take a disc harrow—they will work down easily.

Q.—Do you go cross-ways with them or length-ways?

A.—I find just about as good results from one way as the other. If you use a disc harrow and strike them right they split very easily.

Q.—How deep do you plow?

A.—Four to five inches.

A MEMBER: A man in our neighborhood pastures, and then puts in oats, and then roots. We did that six years, and had excellent results from it; but I think this plan is more satisfactory, because, you cannot always get your land ready for the grain; if you are going to sow grain you must have your land plowed early or you will not get good results.

Q.—Would it not pay to put the proceeds of the wheat into some other grain to feed on the farm?

A.—Yes, if you did that, but there is always the temptation to put it into the bank.

Q.—Would it pay a man to grow wheat and put the money into other grains or to grow the other grains and feed them?

A.—That will depend somewhat on the market prices. This year it would pay you better to grow your wheat and buy bran, although bran is a high price.

THE CHEAP PRODUCTION OF MILK.

By H. GLENDINNING, MANILLA.

I come on at the last of the progamme, and I want to make use of everything that I possibly can. I am very anxious to make use of the speakers who preceded me, and I would say that I endorse what they have said in reference to the crops, and so on. I also want to make use of Mr. Thompson's cows this afternoon to illustrate my points regarding the production of milk. Mr. Whitley told you how to select your cows by testing and weeding out. I believe that the dairy cow is a machine in the hands of the farmer; and any manufacturer in this town who is engaged in the manufacturing business, if he finds he can secure a machine that will turn out more goods at a little less than the old machine that he has in the shop already, he has no compunction in discarding that machine and getting a better one. Too many dairy farmers in the Province are working with the wrong kind of machine; and again, too many men have pretty good cows, and are not feeding them properly. I believe, that if all the cows in the Province of Ontario were properly fed, it would be a surprise to many of the people. It is important to know how to feed the animals you have got. You have heard of the grand results that Mr. Thompson had in his cows during the past year. Now, these results were not obtained by chance. He has been working along these lines for years, and getting the best kind of cow and using the best kind of feed he can obtain. I noticed that Mr. Thompson stated that he fed a quantity of bran. I am very much pleased with the bran. He said he had no doubt but it was pure. Somebody else in the audience seemed to think there was adulterated bran. I want to say that I consider bran one of the best feeds we have for the dairy cow, but when a man feeds a lot of bran, at the price we have to pay this year, it does not leave very much profit, even though he has cows like Mr. Thompson's. I believe the farmers of Ontario should try and produce all the food for their cows on their farms. I believe that the main object we should have is to make money out of them; this is the point I try to work upon. If we have not got the food, we have got to buy it. I want to endorse the statement made by Mr. Groh, in reference to the silo. I believe the dairy farmer cannot make a great success unless he has a silo. You know under natural conditions, that the greatest flow of milk is obtained from the cow while she is on the grass, along in the month of June while the grass is fresh, juicy, succulent and very palatable, plenty of it, the right temperature, free from flies, plenty of fresh water and sunshine. These are the conditions under which you get the best results, but we cannot carry these through the whole season. We must try to carry them through the winter if possible. I believe it is possible to make milk cheaper in the stable than it is in the field. I believe we can make it cheaper in the winter time. I know that statement is liable to be pretty severely criticized; but I am to make myself clear upon that point before I am through. We must have succulent food, and we can get that in the form of corn silage. There is only twenty-one pounds of dry matter in one hundred pounds of silage, the balance consists of water. In protein there is only nine-tenths of a pound in one hundred pounds of corn silage. There are a great many people in this country who make a great mistake in building a silo and feeding corn silage almost exclusively, and at the end of the year have said they did not have very good results, and have gone out of the business. I believe I would be inclined to do that myself. But feed this food along with something else, and then we get good results. Depend upon your corn silage for succulency and palatability. These are things that are required in feeding of the cows. Where we feed bran with corn silage we have had excellents results. The protein in the bran is 12.2 pounds in every hundred, and when you feed bran in connection with corn silage it gives you a balanced ration, and if you feed this food you are sure to have a big flow of milk. Bran has got away out of sight. I can remember the time when bran was considered of no value. I have seen the chutes turned into the creek from the grist-mill and the bran allowed to run down the river. There are men here who have seen the same thing. But you know Dairy Conventions, Agricultural Societies, Farmers' Institutes, Agricultural Colleges, and these things, have been preaching up the value of bran, and we have preached it up to the highest price, and there is not very much in it from a commercial standpoint. We have, therefore, to turn our attention to something else. Our main object is to get that protein. I want to call attention to the fact that the average milk has a little less than 13 pounds of solid matter per 100, and still in that 13 pounds there is 3.6 pounds of protein. If you want to produce milk you must feed largely of that nutriment. You cannot expect to get protein out of a food that does not contain that, any more than you can expect to get flour out of a mill by putting sawdust through it. You must have the right kind of material to get the flour, and you must have the right kind of material to give the cow in order to get the milk.

I do not need to ask you the question, what are you going to feed in its place, because you have been told by Mr. Grisdale. Alfalfa hay will take the place of bran as near as anything we have got, and we can produce it ourselves. You notice that one hundred pounds of alfalfa contains eleven pounds of protein, nearly as much as that of bran. We can put alfalfa hay in the barn where you have an average crop of from five to six tons per year, cutting it three times. You can produce more on good land and proper treatment. You can produce that hay and put it in your barn at $2.00 per ton, against how much for bran? What are you paying for bran?

A.—Twenty-two to twenty-five dollars a ton.

A MEMBER: You cannot grow five tons of alfalfa to the acre on land here?

A.—Yes, you can, the trouble is you don't know how.

(Mr. Glendenning then described his experience in growing alfalfa as given in his address at the Convention of the Eastern Association. See page 23.)

He then added: I say by all means get the alfalfa nitro-culture, and apply it to the seed before you sow it, unless you have already grown it upon the field. If you have grown it for a number of years on your field, the chances are you have that bacteria already in the soil, and you do not need to apply it in that place.

Q.—If you had been growing red clover, would that do?

A.—No, the red clover bacteria will not inoculate alfalfa, but the bacteria works upon the clover and will inoculate it. I asked the bacteriologist at Guelph that question about a year ago, and he said: "We do not know whether it is the same bacteria that works upon it or not, but we know it is interchangeable." Has anyone present in this audience ever tried that culture? If there is anyone I would like to know. There does not appear to be any person.

Q.—What is the cost?

A.—Twenty-five cents, for enough for one bushel of seed.

Q.—Do you cut it at an earlier stage than other clover?

A.—Yes, we cut it when it is coming into blossom. The ideal time is when one-tenth of the blossoms are out.

Q.—Do you salt it?

A.—No. I would not salt alfalfa, or any kind of clover. I have very decided objections to salting hay. Where there is a heavy salting, it comes out brown, it never comes out green. Keep salt away from it, and you will have better hay. I think a good many people fail in growing alfalfa because they do not get a good quality of seed, and then some have failed on account of not getting the culture. The man who pastures his alfalfa field in the fall of the year, can say good-bye to his alfalfa, for it will not stand it. I know that many people say it is a perennial plant, but I know when you pasture alfalfa it simply dies out, and there are a great many people will let their stock, horses, and sheep run on the field through the winter. If a horse gets on the alfalfa field late in the fall or winter, he goes and bites the crown right out, and every time he bites the crown it is a dead plant. I have a field that has been cut for five years, that is the oldest field I have at the present time. We have never allowed anything to run on that field. The gate-way is in the centre of the field, and we never go in there excepting to cut, or to draw out the alfalfa, but at the gate-way you can notice the plants are short and thin, they will not stand tramping or pressing, and if that is the case when the weather is considered best what would it be in the fall of the year when the soil is soft and wet.

Q.—Do you manure that piece?

A.—Yes, it was manured the second year after there were two crops cut off. That is three loads of very short manure to the acre, but the best dressing we ever gave it was with hardwood ashes. It seems to respond to that better than anything else.

Q.—How much does it cost to seed down an eight acre field of alfalfa?

A.—I included that in with the rent. $4 an acre for the land, without any buildings, is a little more than what it is renting at now.

Q.—Why not coil the second crop?

A.—Because we can put it in with the loader, and I must say our best hay is that that is put in with the loader and fork. I want to say that last year and this present season, we have not fed one pound of grain or bran to our dairy cows, and I want to give you two or three instances from our own feeding. First, I will give you one cow that has been just two weeks in. This record does not apply to the first week at all, but it commenced after she had been a week in, and I find that she gave 291½ lbs. of milk in seven days, or an average of 41½ lbs. a day, testing 4 per cent. of butter fat. Now, we feed fifteen pounds of silage and cut straw, and sixty pounds of cut roots, and twenty pounds of alfalfa hay. We fed that cow for 9½ cents per day, and she is producing 41½ lbs. milk testing 4 per cent. fat; that would be eleven pounds of butter fat in seven days. We are supplying cream to the creamery, and after paying all expenses of making, and everything in connection with it, they paid us 28 cents per pound for butter fat. The amount we would receive for that butter fat at the prices we were getting in December would be $3.25. The cost of feeding would be 66½ cents, leaving us a profit of fully $2.58 for the seven days. Do you believe you can produce milk any cheaper in the pasture than you can in the stable? You will notices there is not a pound of any kind of grain in that except what the corn silage contains.

Q.—Do you mix your silage and cut straw together?

A.—The silage freezes more or less on the top of the silo, and that silage is thrown down and mixed with the cut straw, and a couple of pails of water thrown on it, and this is allowed to lie there until the next morning.

Q.—Is there any grain in it?

A.—Yes, we aim to get as much grain as possible.

Q.—Do you salt it?

A.—No; we salt each feed, of course. There is a small handful of salt put in for each cow. In that particular stable there are sixteen cows, and we put in equally sixteen small handfuls of salt, it is turned over and allowed to lie there about twenty hours.

Q.—Do you mix your pulped roots with that?

A.—No, we do not now. Some days when you want roots the wind-mill will not run, and the consequence is some days there are roots, and some days there are not; and now the man has stopped pulping the roots and is feeding them in the unpulped state. One day the man was busy, and he did not get the silage mixed up as usual, and he threw the cold silage from the silo and fed it to the cows, and he said that if it had not been for that this cow would have made an average of 42 pounds of milk during the week. The result of the whole sixteen cows was that he had just one pail of milk less that day than he had other days; so that I think it shows that there is something to be done in the way of properly preparing feed for the cows.

Q.—Would that cow require grain afterwards?

A.—She might milk down. I would not say that grain would not do good, but I say that if you add grain, you add a great deal to that ration. I know that cow is a fleshy cow, and she has milked down in condition.

Q.—Supposing the wind was at all times so that you could pulp your carrots?

A.—I would say to put your pulped roots in. We keep a fairly accurate record of our cows.

Q.—Are you done with the clover?

A.—I do not know.

Q.—Is lucerne as good as red clover?

A.—Much better, there are 6.8 of protein in 100 lbs. of red clover, in the case of alfalfa we have 11 lbs.

Q.—Would you give up red clover and go entirely into alfalfa?

A.—No; because in the case of red clover you can keep up your rotation, and with alfalfa you cannot have a rotation. I lived in a country for seven years where they had lots of that clover, and they raised more of that than they did of the other.

Q.—You would not pasture alfalfa at all?

A.—If you pasture alfalfa it will disappear; it should not be pastured unless you want it to disappear.

Q.—When you are done with alfalfa what is your land good for?

A.—It will raise you the biggest crop of corn you ever saw in your life. Pasture it in the fall of the year. Put you horses on it, and let it lie until the warm weather comes in the spring, about the middle of May plow it up and it will plow like an ash bed.

Q.—It will crack?

A.—No. The roots will be rotted by the spring, and it will simply be like a lot of manure.

Q.—Would you put timothy with it?

A.—I have very serious objections to putting timothy or anything else with it. You would not get much good of your timothy, because when the first cutting came your timothy would hardly be started.

Q.—Would not the timothy help to cure it?

A.—No.

Q.—Is there any danger of it dying out the first winter?

A.—No; alfalfa is hardier with me than the red clover.

Q.—What kind of land have you?

A.—Clay loam.

Q.—Did it kill out last winter?

A.—No. I do not think that land that will heave is good land for alfalfa. Generally about the second or third year you get your biggest crop. I have cut this for five years, and it is in good shape, and it will be in good condition for eight or ten years. June grass creeps into the field, and I have never seen a field of alfalfa but what there has been some trouble with the June grass.

Q.—How does alfalfa do on the Experimental Farm at Ottawa, as compared with the red clover for wintering?

Mr. Grisdale: The year before last we lost nearly all our red clover and the alfalfa came in better shape. Where the alfalfa was on high ground and the snow did not blow off, it came through in good shape. But where the snow blew off it did not come through; where there was water in the hollows it died out.

Q.—How many cows have you?

Mr. Glendinning: I have sixteen at the present time giving milk.

Q.—How do you store your roots?

A.—This year I have between eight and nine thousand bushels of roots.

Q.—Will the cows winter through on that ration?

A.—Yes. We wintered them all last year on that kind of ration, and it was corn silage more than roots. Cows thrive right up on it. We had another cow giving 28 lbs. of milk a day, testing 4.4 per cent. of fat. In July she gave 28 lbs. On the first day of January my herdsman told me that that cow was milking pretty nearly as well as she had in the summer. I got the scales and weighed the milk in the morning and at night, and I found that it weighed 25 lbs., but instead of 4.4 it tested 5.2 per cent. of fat. She was giving more butter fat in the stable on the first day of January than she had in the month of July.

Q.—How much seed would you recommend planting to the acre?

A.—15 to 20 lbs.

Q.—What crop did you get the seed from?

A.—From the second crop.

Q.—Would you be surprised to hear of a catch of alfalfa where you only sowed 3 lbs. to the acre?

A.—If every seed made a catch you might have a pretty fair field, but I think you would have a lot of heavy stalks, and I would not like to risk it.

Mr. Groh: We grew three acres of alfalfa, and we found a lot of weeds in it that came from a foreign country. I say you should not be willing to introduce a new weed, and I would warn the people to watch for any new weeds. If you let them get abroad we might have another enemy to fight.

REPORT ON COMPETITIONS OF CHEESE AND BUTTER.

Prize List.

September White Cheese:

		Total Score.
1st Prize,	Mary Morrison, Newry	96.
2nd “	Jas. Paton, Atwood	95.08
3rd “	J. E. Stedelbauer, Fordwich	95.
4th “	Alex. McCallum, Kintore	94.91

September Colored Cheese:

1st Prize,	C. Donnelly, Scottsville	95.66
2nd “	W. A. Bell, Pine River	94.50
3rd “	G. R. Stone, Currie's Crossing	94.41
4th “	M. Stevens, Carholme	94.33

October White Cheese:

1st Prize,	Mary Morrison, Newry	95.16
Tie for 2nd “	W. S. Stocks, Britton	95.
“ 2nd “	J. E. Delmage, Trowbridge	95.
4th “	J. T. Donnelly, Union	94.83

October Colored Cheese:

1st Prize,	E. Ginther, Winger	94.83
2nd “	J. T. Donnelly, Union	94.50
3rd “	J. E. Stedelbauer, Fordwich	94.33
4th “	F. McNeil, Listowel	94.16

Box Creamery Butter:

1st Prize,	Jno. Cuthbertson, Sebringville	92.50
2nd “	R. A. Thompson, Atwood	92.16
Tie for 3rd “	F. E. Brown Petrolia	92.
“ 3rd “	R. C. Bothwell, Hickson	92.
“ 3rd “	E. M. Johnston, Innerkip	92.

One Pound Prints, Creamery Butter:

1st Prize,	R. Johnston, Bright	94.16
Tie for 2nd “	J. B. Doan, Birnam	93.16
“ 2nd “	R. C. Bothwell, Hickson	93.16
“ 2nd “	W. Waddell, Kerwood	93.16

Box, October Creamery Butter:

1st Prize,	F. E. Brown, Petrolia	93.58
2nd “	W. Waddell, Kerwood	93.14
3rd “	J. W. Wilson, Keyser	92.31
4th “	J. R. Almont, Welland	91.67

Special Prizes.

Cheese Buyer's Trophy, for Highest Scoring Cheese. Mary Morrison, Newry.

Special, September White. By The Ballantyne Dairy Supply Co., Stratford. J. E. Stedelbauer, Fordwich.

Special, September Colored. By C. H. Slawson & Co., Ingersoll. C. Donnelly, Scottsville.

Special, October White. By C. H. Slawson & Co., Ingersoll. (Tie) W. S. Stocks, Britton, and J. E. Delmage, Trowbridge.

Special, October Colored. By The Ballantyne Dairy Supply Co., Stratford. J. T. Donnelly, Union.

Special. By The Heller & Merz Co., New York, to the Butter Maker securing the highest score on butter in Class 3 and 4, colored with Alderney Butter Color. R. Johnston, Bright.

Special. By The Heller & Merz Co., New York, to the Butter Maker securing the second highest score on butter in Class 3 and 4, colored with Alderney Butter Color. F. E. Brown, Petrolia.

Special, Best Finished Cheese. By the J. B. Ford Co., Wyandotte. J. E. Stedelbauer, Fordwich.

Special, for the Neatest and Most Attractive Exhibit of Butter. By the J. B. Ford Co., Wyandotte. Jno. Cuthbertson, Sebringville.

Mr. Paget, Past President, who occupied the chair in the absence of the President, said: There is one characteristic feature in connection with the report of the judging contest, and that is the uniformity both in connection with the cheese and butter. All of you who have been over to the hall, and have looked over the cheese, would see that they were a most uniform lot of goods. I can remember when we first introduced the exhibition of butter and cheese in connection with this convention that that was not the condition that existed. We found all forms and size of cheese, and we found that the scores varied very many points. Why is it that that condition of affairs has been remedied? I think you will admit, without any hesitation whatever, that it is due almost entirely to the system of instruction that has been carried on by the Association during recent years under the guidance of the Department of Agriculture. If there is one thing in which we have advanced it is in the producing of a uniform article of cheese and butter; and that is very strikingly demonstrated in connection with this exhibition in the hall at the present time. You will notice that there is only a very small range of difference in the scores of any of those who have taken prizes. And that is not all. If you will read the score cards on the cheese you will find that even those that do not score the highest are only a point or two below some of the prize cheese. I think it is something that the Association and the Department of Agriculture can congratulate themselves upon, as well as the dairy instructors of this country. If there is one feature that helps our dairy industry more than another it is that we produce a uniform article of goods. We have accomplished that mainly in connection with this work by our system of instruction.

INSTRUCTION IN CHEESE FACTORIES IN WESTERN ONTARIO, 1907.

By Frank Herns, Chief Dairy Instructor and Sanitary Inspector.

I take pleasure in presenting my first annual report of instruction in Western Ontario. Your former Secretary-Treasurer and Chief Instructor, resigned in April, and it was with considerable uncertainty on my part as to the future that I took charge of the work. However, Mr. Barr had the work so well organized during his term of office that things worked out during the season of 1907 very well indeed.

This season will be remembered as a successful one for the patrons, high prices prevailing, although the make was somewhat light in some sections owing to poor pastures. It is to be hoped milk producers will make preparation for summer silage or soiling crops for 1908. The makers have not all realized the profits they should, owing to short makes, and too low prices for manufacturing.

The system of instruction was changed somewhat this year. The instructors were appointed sanitary inspectors along with their former work of instruction. The fees for instruction work formerly paid by the factories were not asked for this year, the Ontario Department of Agriculture very kindly taking over the whole financial responsibility and taking charge of the instruction work in conjunction with your Association. The groups were enlarged and changed as follows:—Ingersoll and Woodstock Group, 36 factories; Stratford Group, 35 factories; Listowel Group, 34 factories; Simcoe Group, 33 factories; Brantford Group, 29 factories; London Group, 34 factories; Northern Creameries, 36; Southern Creameries, 37; while 13 cheese factories outside of the groups were looked after by myself. Six of these were closed this year, making a total of 207 cheese factories and 73 creameries visited this year. There was one instructor less employed this year.

Before beginning work the instructors spent a few days at Guelph, during which time lectures and demonstrations were given by the professors of the College, which were very much appreciated by the instructors. Considerable time was taken up in thoroughly discussing the work for the year, so that all started out with a uniform method along every branch of the work. The quality of the cheese up to about the end of June were very fine. The weather was cool, and nature took care of the milk. Patrons should consider this a good object lesson in cooling milk. When the hot weather came we were troubled in some cases with cheese showing little round holes like gas holes, and in a few cases the cheese were very near the acid line, but still showed the holes. We found that by setting as sweet as possible, cutting finer and getting the curds firm before acid enough came on for dipping, stirring fairly dry and leaving a little longer before milling, these defects were overcome. The trouble seemed to be that the milk contained gas, and was in some cases over-ripe, and it was hard to get the curd firm before they would have enough acid to dip, giving more acid in whey only made it worse. During September a few of the boys got the cheese just a little weak. The milk seemed to be a little richer earlier in the fall than usual, and the curds retained more moisture than expected. The cheese on the whole this year in Western Ontario were very good. Very few acidity cheese were reported. There is still, however, plenty of room for further improvement.

More improvements have been brought about this year in the sanitary conditions of our factories, particularly in the matter of whey tanks, drains, floors, equipment, and inside and outside appearances. I do not think our factories were ever in better condition. Some, however, are not up to what they should be, and not kept as clean and tidy as they might be. We have been promised improvements at these factories. We have tried to use good judgment and common sense in dealing with sanitary conditions, believing that improvements could be brought about through time. We tried not to abuse the position in which we were placed, and so far as I am aware this has proven the best policy. I have written to, and in a number of cases visited, several factories where the sanitary conditions were extremely bad, and in every case but one the necessary improvements were made without any further trouble.

The instructors visited a number of patrons in regard to the care of the milk, giving instruction in this most important point. Improvements were made where asked, particularly in the matter of new cans to replace old and rusty unsanitary ones. The Department of Agriculture very kindly consented to having a special officer appointed by your Association to deal with any cases of milk adulteration which might be found by the makers or the instructors. Mr. I. L. Farrington received this appointment, and I believe performed his duties to the entire satisfaction of all concerned. Sixty patrons were prosecuted for delivering deteriorated milk at the cheese factories. They all, except one, practically pleaded guilty to the charge, and were fined from $5 to $35 by police magistrates before whom they were taken whenever possible. This is having a good effect, and will soon stamp out to a great extent the tendency to tamper with milk. No settlements outside of court were allowed. At all the district meetings this work was highly commended, and was recommended to be continued along with the work of instruction. This is also having another effect, that of renewing the agitation for the payment of milk by the test at our cheese factories; and this winter, at the annual meetings, I believe several more will adopt the system.

I do not think there is anyone but who will admit that returning ordinary whey in the cans has an effect on the milk supply. It does not seem practical to return whey in any cans except those in which the milk is drawn. I believe the whey should be as clean when returned as we expect the milk to be when delivered. Certain flavors, due to bacteria, may become present in one or more patron's milk. This is brought to the factory, many times undetected, as they are not far enough advanced. These bacteria are not killed in the process of making; they pass into the whey tank, and are widely distributed through the milk cans among the other patrons. Thus the entire number of cans may become contaminated through the medium of the whey. If not sterilized their growth rapidly increases and becomes present in almost all the cans. It becomes necessary to free the whey from these undesirable germs. We may clean a whey tank every day, but unless the tank is thoroughly sterilized with live steam it is not clean from a bacteriological standpoint. In the case of wooden tanks, the wood being somewhat porous will contain germ life impossible to dislodge with ordinary washing. The whey tanks have been kept cleaner this year than ever before, but there is still room for improvement. I would strongly recommend the heating or pasteurizing of the whey in the tanks, heating to 165 degrees, not over, or the albumen in the whey will coagulate, making slimy whey. It will keep the tank cleaner and make them easier to keep clean; it keeps the fat in the whey; there is no fat to dispose of when the tanks are emptied, and this has always been one of the main excuses for not cleaning the tanks; it keeps the whey sweet, which is an advantage to patrons; it will inhibit the growth of all germ life in the whey; it makes the cans easier to clean, and there is no old sour whey flavor after the cans are washed; the cans will wear longer since sweet whey does not eat off the tin as sour whey does; the whey can be fed to young calves and pigs, which increases the feeding value; it will kill and prevent the bitter or yeasty flavor, and has done so at three factories this past year that had been troubled with bitter or yeasty flavor for years. It also prevents the spread of disease and other germs in the cans, particularly tuberculosis, which might affect the hogs, and lessens the chances of having over-ripe milk during hot weather, as it gets rid of the acid starter so likely to be present in cans not properly sterilized after washing. This must be done every day, and done properly, or it will be of no benefit. It will cost about 50 cents per ton of cheese, or about 50 cents to $1 for each patron, which is a small cost when the benefits are considered. Since the patrons get these benefits, they should be willing to pay for pasteurizing the whey.

There were 207 cheese factories visited past year by our instructor, 46 more than last year. There were 620 full day visits and 605 call visits, making a total of 1,225 visits made to the factories. 1,807 curd tests were made and 840 of these samples were found tainted. 588 patrons were visited, being 83 more than last year, although we had one instructor less. 35,074 lactometer tests were made, or 8,656 less than last year, with 46 factories more to look after and one instructor less. 1,700 Babcock tests were made, or 894 less than last year. This shows less attention given to milk testing by the instructors, and more attention paid to visiting patrons and improving the milk supply. 332 samples were found to be adulterated, 272 on one test, and 60 on several tests. 1,688 new milk cans were bought and 298 cans repaired, showing co-operation of the patrons with the instructors in the matter of replacing or repairing rusty and worn out milk cans.

181 are using pasteurized culture.
189 are using the acidimeter.
19 only are paying by test.
12 only have a cool curing-room.

The following improvements in factories are reported.

31 buildings were painted either inside or out.
60 factories made general repairs.
16 put in new floors.
24 repaired the floors.
23 put in new whey tanks.
4 were built, entirely new.
9 were entirely remodelled.
2 put in new drains.
6 drilled wells.
7 put in cool curing-rooms.
23 put in new vats.
24 put in new hoops.
11 put in new curd mill.
12 put in new presses.
12 put in new curd knives.
12 put in new agitators.
15 put in new sinks and racks.

63 factories got new pumps, repaired boilers, got new scales, put in new engines and boilers, got new weigh can, hot water barrels, etc. Total expenditure of $35,882.00, or $7,132.00 more than last year.

It is very gratifying to note the continued improvements in our factories. An experimental sewage plant was installed at Innerkip factory by the Department under the supervision of the Provincial Board of Health, and I believe is giving good satisfaction.

I personally visited 131 factories and have attended a number of annual meetings, as have also the instructors. A large number of applications for speakers to attend annual meetings during January, February and March are coming in. At many of these meetings the patrons passed resolutions agreeing to pay the cheesemaker 50 cents per ton of cheese for pasteurizing the whey. At some of the meetings they also very cheerfully raised the price for making.

District meetings were held during during November and December in the different groups. Some of these were exceptionally well attended, while others were not. Considerable interest was shown in the discussion of the several subjects brought up. Resolutions were passed at all the meetings *re* not receiving milk rejected at neighboring factories on account of flavor; also not to receive milk from a neighboring factory where the patron left for no other reason than being fined for sending adulterated milk. The question of a cheese scoring contest for the coming season was discussed very favorably at the different meetings.

The instructors have all worked hard, and have done their best to make the season's work a success, and I wish to express my appreciation of the loyalty and kindly feeling which the instructors have shown towards me and the work assigned them this year. Without their hearty support and good feeling my work would not have been so pleasant.

I also wish to express my thanks to the Directors of the Association and the members of the various committees for their hearty co-operation and help they have given me.

I wish to thank the cheese and butter makers, factorymen and buyers for their kindness to me and the very pleasant relations existing this year. They all had a pleasant word of encouragement, and very kindly refrained from criticizing our mistakes too severely.

CHEESE FACTORIES INSTRUCTION.

Group and Instructor.	No. of factories visited.	No. of visits.	No. of call visits.	No. of curd tests made.	No. of samples tainted.	No. of lacto-meter tests.	No. of Babcock tests made.	No. of patrons visited.	No. of new cans bought.	Expenditure.
										$
Ingersoll & Woodstock, E. N. Hart	36	116	102	704	477	5,557	211	121	65	10,709
Simcoe................Geo. Travis	33	68	138	173	41	4,299	189	61	500	1,850
Brantford..............R. H. Green	29	103	113	153	56	10,290	568	89	434	1,956
Stratford..............Alex. McKay	35	130	100	541	220	3,098	204	202	120	11,525
Listowel ....J. R. Burgess	34	101	75	231	43	5,060	120	52	142	7,262
London ....W. Hamilton	33	103	61	5	.3	6,370	419	3	427	2,580
Outside factories.......F. Herns	7	7	16	......	....	400	11	....	......	......
Total......................	207	628	605	1,807	840	35,074	1,722	528	1,688	35,882

INSTRUCTIONS IN CREAMERIES, 1907.

There were in operation this year 73 creameries. These were all visited regularly by the Instructors. Six creameries closed this year.

Two hundred and thirty-three full visits were made, and 62 call visits, making 295 total visits; 157 patrons were visited. This seemed to be all that could be reached this year on account of the large territory covered by the Instructors.

Sixty creameries are cream-gathered; 4 separator, and 9 both cream-gathered and separator; 59 creameries are now using the Babcock test; only 14 creameries are still using the oil test; 4 creameries are weighing the cream sample for Babcock test. This, I think, should be encouraged, for I believe the patrons are better satisfied. Besides it is the most correct method where thick and thin cream and sweet and sour cream is received.

Sixty-six creameries are using combined churns, only seven using box churns; 7 are using a pasteurizer. I think it is a mistake not to increase the use of the pasteurizer. Fifty-four creameries are collecting cream in cans; 19 creameries are still using cream tanks; 12 are using culture; 2 cream culture; 7 skim milk; and three whole milk; 25 are using a cooler. It will pay to use a cooler, 33 have good cold storage; 22 very fair; 11 fair; 3 poor; 4 none.

Two hundred and sixty tests were made for moisture by the beaker method. These were all duplicated, only 14 samples showing over 16 per cent. of moisture. Those showing over 16 per cent. moisture were churned and washed at higher temperature than ordinary. The average moisture content was 14 per cent. Owing to some difficulty in getting suitable scales for weighing the samples of butter for testing, it was rather late in the season before tests could be made. Further work will be done along this line next year, as it is giving us some valuable information. The Instructors report improvements in the matter of floors, drains, utensils, and inside and outside appearances.

CREAMERY INSTRUCTION, 1907.

——	Western and Southern.	Eastern and Northern.	Total.
	Fred Dean, Instructor.	Mac Robertson, Instructor.	
Creameries	37	36	73
Full day visits	133	100	233
Call visits	25	37	62
Total times at creamery	158	137	295
Patrons visited	47	110	157
No. of separator creameries	2	2	4
No. of cream gathered creameries	28	32	60
No. of both combined	7	2	9
No. using Babcock test	34	25	59
No. using oil test	2	12	14
No. of creameries using box churn	3	4	7
No. using combined churn	34	32	66
Tests made for moisture	181	79	260
No. of samples showing more than 16 per cent. moisture	11	3	14
No. using a pasteurizer	7	..	7
No. using cans for collecting cream	37	17	54
No. using tanks for collecting cream	..	19	19
No. using a cooler	13	11	24
No. using a culture	10	2	12
Expenditure	$8,875	$8,079	$16,954

The following creamery improvements are reported:

11 repaired.
6 put in new refrigerators.
15 painted either inside or outside.
14 put in new floors.
4 remodeled.
5 built new.
12 repaired floors.
2 removed hogs and built new pens.
4 built new ice house.
3 drilled new wells.
11 put in new churns.
8 put in new cream vats.
3 put in new drains.
15 put in new engines, coolers, boilers, water tanks, and so on.

A total expenditure of creamery improvements	$16,954
Cheese factories improvements	35,882
Total expenditure for 1907	$52,836

I would strongly recommend our creamerymen to pay more attention to cold storage, the use of coolers for cooling the cream as a means of saving ice, and more quickly getting the cream to low temperatures, thus checking the rapid development of acid and other flavors. Also a more frequent collection of cream, and a determined effort to secure richer cream, thus saving in loss in the buttermilk, and being able to churn at lower temperature. It is true that a great deal of our butter has this year gone into local markets, but still we must remember that considerable butter is exported, and that quality counts no matter where it may be consumed. There did not seem to be so much complaint regarding mottled butter this year.

I wish to thank the creamery instructors for the efficient way in which they carried on the work, and also the creamerymen and buttermakers for their hearty co-operation.

THE PREPARATION AND CARE OF CULTURE.

By E. N. Hart, Ingersoll.

The paper I have been asked to read before our Dairymen's Convention deals with the question of cultures; not particularly with the making of them but the care they should receive when properly made; also touching briefly on a few of the mistakes which occur in different factories of Western Ontario.

I consider it a great honor to be asked to prepare this paper for our Convention. I am dealing with a very important branch of our great industry, and I have to thank all the Instructors for the valuable information they sent me, for I thought it necessary to collect some of the different methods used in the factories and by different makers.

In the first place let us ask ourselves why do we use cultures or starters? Are they necessary for one purpose only, to hasten the ripening of milk when not at high enough acidity?

We as cheesemakers in Western Ontario must bear in mind that when we use a culture or starter in a quantity of milk it not only hastens the ripening of that milk, but the flavor of the cheese or butter made from that milk will depend somewhat on the flavor of the culture or starter used.

Let us look back to the history of starters, and we will find they were used in the dairy industry a great many years ago. The fact that starters helped in the manufacture of dairy products were recognised years ago by practical men, even before scientists recommended the use of pure cultures. The introduction of pure cultures only dates back to 1890, and were recommended by Prof. Storch, who urged their use in creameries in Denmark. In speaking about the different kinds of starters we might classify them under two names 1st, natural; 2nd, commercial.

To Prepare a Natural Starter. I would suggest the selection of a number of different samples of best milk coming into the factory; put into sterile glass jars and allow the samples to stand until sour, at a temperature of about 70 degrees F. The sample which coagulates into a smooth uniform curd, and has a pleasant acid taste and smell, is the one I would use as a mother starter.

I would advise makers not to bother with natural starters. By this statement I do not condemn a natural starter, for I believe that good starters have been made from a natural mother culture, but I think the best results are obtained from commercial cultures. By following the directions sent out with the pure cultures we should be able to make a good, clean flavored starter. But here is where we begin our mistakes. We assume all commercial cultures are found pure, and contain organisms suitable for practical work in the dairy, and should produce a pleasant flavor and no gas; but we should remember that commercial cultures are liable to become contaminated if not used as soon as opened.

I think it essential to have a perfect system in preparing cultures. We should exercise care in the selection of cans, see that they are well made, that the seams are well soldered, and that they are provided with snug fitting lids. For general use in cheese factories I think the ordinary shot gun cans about 8 inches wide and 24 inches deep, holding about 50 lbs., answer the purpose very well, and would recommend their use in preference to a larger can, as the milk is easier heated and cooled when in small quantities. I think more care should be given to the cleaning and scalding of cans in which the starter is kept from day to day, and the use of a stick or paddle or a common dipper for stirring the milk should be discarded, and replaced with a small wire handled dipper, to be used for nothing else. My reason for condemning the stick or paddle is that the wood becomes more or less saturated, and the cream gathers upon the upper end and perhaps not thoroughly scalded before using next day. The common dipper very often gets broken about the handle, and is one of the worst scources of contamination. I think too much care cannot be exercised in the selection of the milk at the weigh porch; also a curd test should be made frequently of the milk you select. Last season I made a number of curd tests of the milk that was selected by different makers for their cultures. Some of the samples were quite off in flavor; another very gassy, and another floated in one hour. I think by selecting the mornings's milk it will generally give best results.

In heating the milk for cultures some of the makers use a large milk can and turn a live steam pipe into the milk direct from their boiler, and claim good results. I am of opinion that this method cannot be discarded too soon, except where there is no other means of pasteurizing. Do not use boiler compounds, for where boiler compounds are used the water is not any too pure. It looks to me like a step in the wrong direction.

Mistakes are very often made in taking too long a time to heat up the milk. The cans are placed into a tank or barrel, and the steam is turned on, and let boil for several hours without stirring, which often gives the milk a burnt flavor; also too long a time is taken to cool them back to 60 or 75 degrees, from 185 or 180 to 100 degrees. I do not think any serious trouble will start, but I am of the opinion that where cultures are left standing at a temperature anywhere from 100 to 70 degrees for a long time uncovered before being inoculated with the pure lactic acid germ, the undesirable germs have every chance for reproduction. If makers would provide themselves with a good pasteurizing box, and also with cans as previously described, and have the water heated somewhat before placing the cans of milk in the box, it would not take very much time for pasteurizing, and better results would be obtained. I have found that where the making of cultures involves a lot of time and work, it is often done in a very haphazard manner.

Good milk selected at the weigh porch, pasteurized to a temperature of 180 or 185 degrees, and cooled immediately to 65 to 70 degrees, should give us a medium to be ready for inoculation. As instructed by the direction sent out with the cultures, we find it necessary to propagate the culture several times before using, and sometimes we find the starter with not the best of flavor and needing further propagating. A possible explanation is that each organism must become adapted to the medium in which it grows before it gives its characteristic odor or flavor in that medium. The cultures as sent contain the organisms in a more or less dormant condition. These organisms regain their vigor and increase their acid forming properties after several propagations.

I do not think any hard or fast rule can be laid down to the temperature or the amount of mother culture to be used. It will depend somewhat on the length of time from making till using, and the temperature at which it is held, but no more should be used than will give the desired acidity. By testing the acidity from day to day the maker will soon know how much mother culture to add to produce the amount of acid required when ready for use; but I would prefer using a little more mother culture and growing it at a low temperature than to use less culture and hold it at the higher temperature to ripen. I think you will get a smoother texture and better flavor, with less danger of over-ripening.

The acidity for a culture to have when ready for use might be discussed somewhat, and opinions vary considerably; but from the information received from the several districts in Western Ontario the acidity of cultures in the morning when ready for use vary from .6 to .9, and sometimes one per cent. I think we find that when a culture has from .65 to .75 and not over .80 it gives the best results.

We are reminded that the under-ripening of starters is just as important to guard against as over-ripening. Prof. McKay tells us that about the time milk begins to turn sour it has a rather disagreeable flavor, after more acid develops the undesirable flavor begins to disappear, and the milk gets a clean acid taste. An explanation is given by Prof. Storch, the well-known authority on cultures. He tells us that the disagreeable flavor is due to the action of undesirable organisms during the first souring stage, and as the souring progresses these germs are subdued and gradually crowded out by the desirable acid producing types.

Before using a starter I would remove one or two inches of milk from the surface of the can with a sterilized wire handle dipper, as the surface is liable to contamination from outside sources, and break up the remainder by stirring well in can. I think this the best time to take out a small quantity to propagate the culture for next day, too many cultures are left sitting around in cans, pails and dippers which become contaminated before using.

The only vessel that should be used to hold the culture for propagation should be a sterilized glass jar, kept air tight, and in a cool place. A very good plan practiced by some of the best makers is to keep out an extra sample, seal it air tight, and put it in a cool place. Should anything happen to your starter through the night by being upset or steam pipe bursting you always have another culture in good condition. I think a culture is in good condition when you open the can in the morning, and find the whole mass firmly coagulated, no liquid to be found on top, and having a mild acid flavor, pleasant to taste and smell.

In conclusion, let me say that these little oversights are generally the beginning of serious mistakes. The time has come when we must study our cultures more. To know what to do with them, and what they will do for you. It you get a good culture or a poor one, you must know just what you are handling, and what results you are going to get from the operation.

A culture properly prepared and cared for, and judiciously used has been found a benefit to the dairy industry.

A MODEL SITUATION FOR TAKING CARE OF MILK, AND WHAT CONSTITUTES A CLEAN FACTORY.

By James R. Burgess, Listowel.

These, perhaps, are two of the most important questions we have to contend with in the necessary improvements required to further improve the quality of Canadian cheese. The quality of the cheese made depends, largely, almost entirely on the quality of the milk delivered at our factories, at least at the majority of our factories in Western Ontario.

Therefore, where the most improvement is required is in the quality of the milk delivered. This can only be attained by more care and attention, and improving the situation for taking care of milk.

We find milk being cared for on the farm in a great many different ways. At some places there has been no provision made for cooling purposes; the milk is put into the can and gets no attention whatever.

Sometimes the cans and utensils, are not clean; there is no strainer used; the milk is left near the barnyard or hogpens, or on the milk stand by the road side.

Again we find the cans and utensils clean and bright, and the milk is supposed to be cooled by setting it in a tub, containing, perhaps half as much water as there is milk, and the water is never changed. This instead of improving the milk, improves the conditions for the growth of bacteria and bad flavors, because the water and the milk soon come to the same temperature and the high temperature is retained for a longer time than it would be if no water were used. When water is scarce the milk is sometimes left in the pails and stirred till cool; but it is impossible to get the temperature below that of the surrounding air, and this makes it impossible to have the milk in the best condition in hot weather without the use of water or ice. There is no advantage in dipping and airing milk over stirring it, but it is a disadvantage when the surrounding air is not pure.

Leaving the milk at high temperature in places where the surroundings are untidy and impure is the most common cause of milk being tainted and over-ripe.

Sometimes the milk is cooled by using creamery cans filled with ice, and set in the can, but when left the milk farthest away from the ice would become warm more quickly than if it was surrounded by water or ice.

Milk is also cooled by setting in creamery cans, or pails, in a tank of cold water, before putting it into the large can. This method is all right where the milk supply is small, but where there is a large quantity of milk it would make too much work.

When a running stream of spring water is near by, a good place for cooling milk can be arranged by having a box or tank placed in the stream, and a house built over it. This saves the labor of pumping, and there is always fresh cold water around the milk.

There are different methods of cooling and caring for milk, which give good results; but what every patron should have is the best, most convenient, and practical way.

In speaking of a model situation for taking care of milk, we must first consider the main points that govern the keeping qualities of milk. The cows should be healthy, have free access to salt, plenty of pure water and good pasture. Cleanliness where the milking is done is essential; and also of the person milking.

The strainers, cans, pails, and all utensils should be thoroughly clean and bright, free from rust and dirt in any shape.

As soon as the milking is done, it should be taken out of the stable or milking yard to a place where the air is pure and be strained and cooled as quickly as possible to a temperature of from 55 to 60 degrees, always using a thermometer to determine the temperature. There should be plenty of pure cold water and ice, available; by the use of ice the cooling can be hastened, and the amount of water required lessened.

A milk house is required. It should be a good distance from the barnyard, or where the surroundings are impure, and should be kept clean and tidy. For the purpose of cooling the milk, there should be a tank made of wood or cement, large and deep enough to allow the cans to be set in, and to hold enough water to come above where the milk comes to, and a space of three or four inches around the sides. There should be an outlet pipe near the top to allow the water as it becomes warm to be carried into the watering trough, and also one at the bottom to empty it occasionally.

If a windmill is used for pumping, it is well to have a large supply tank and piping to carry the water from it to the small tank. If there is no windmill, the milk house and tank should be near the well. A windlass is convenient for raising and lowering the cans out of and into the tank.

It is convenient to have a car or truck and a track laid from the tank to the milk stand. Sometimes the milk house is built close to the barn or stable, but if it is away from impure surroundings there is less danger of the milk being contaminated. The cost of providing a tank and milk house properly and conventiently constructed, on every patron's farm would be small, compared with the amount of money that is lost during the warm weather by milk being over-ripe and tainted, causing an inferior quality of cheese to be made, besides taking more milk per lb. of cheese.

It is impossible to get the best results, either in the quality of the cheese or the amount made, unless the milk is kept clean, sweet and cool; and in order that a cheese maker can expect and demand milk delivered at his factory in sweet, clean conditions, it is essential that the factory be kept clean and tidy. And not only for this reason, but because he will have more influence with his patrons, as it sets them a good example; it makes his work easier, and it is necessary in order to manufacture the finest quality of cheese and finish it with the clean tidy appearance it should have.

What constitutes a clean factory is not only the make-room walls, floor, vats, and larger utensils, but it is everything, from the largest to the smallest in and about the boiler-house, make-room, press room, curing room and surroundings of the factory, including the manager and employees.

The boiler, engine and boiler-house should be kept as clean and neat as any other room. It can be done if the boiler, engine and piping is blackened with lamp black, linseed oil and turpentine; or painted; the walls and ceiling whitewashed or painted; some shelves or nails put up to keep the tools on, and kept there when not in use.

The valves and unions should be kept packed to prevent waste of fuel, wet floors, and the room from being full of steam. The floor should be swept or scrubbed daily. The wood neatly piled and where coal is used, the dust can be kept down by keeping it damp.

The make-room walls and ceilings should be whitewashed or painted. The sinks, press, vats, and pan bottoms should be painted, and all piping should be painted with aluminum, which tends to brighten the room. The windows should be thoroughly and regularly washed; The weigh can, scales, porch, conductors, strainers and every utensil as soon as possible after being used should be thoroughly washed and scalded and put in its place. In a cheese factory there should be a place for everything, and everything kept in its place when not in use. A room does not look clean and tidy if the floors are wet. Keep the floors dry, and do not try to change a strainer from one vat to another, when half full of milk. If a strainer made of perforated tin or fine wire fastened on a rack, is used, and a piece of cheese cloth laid over it, the cloth can be lifted off and put into a pail and rinsed out in a very short time, and then be changed without spilling any milk. Do not allow the whey to run over the floor, when running down a vat or after dipping. By the use of whey boxes made of tin or wood this can be prevented.

At dipping use a conductor or whey box to carry the whey from the end of the sink to the gutter, and the use of a dipping board to rest on the end of the vat and side of the sink to prevent the curd from being spilt on the floor is preferable to a cloth.

The vats after dipping, when washed and scalded should be wiped around the outside with a damp cloth every day.

The press and hoops should be washed and scalded every day; also the sinks. The sink cloths should be wrung out and shaken, and not be left to soak in whey every night, unless there are two sets of cloths. When there is only one set, and put in whey every night, they do not get a chance to be properly aired and get a heavy whey smell, which sometimes develops in the cheese.

The gutters should be scrubbed down every day. The bandagers or fillers should be as thoroughly washed as any other utensil.

Flowers in the windows of the make room give the factory a more attractive appearance.

Have a system of doing your work, and your factory will look tidy and your work be easier. Keep out the flies by the use of screen doors and windows and cleanliness.

The cleaner the factory and surroundings are kept the fewer flies there will be around.

The curing room walls and ceiling should be painted or whitewashed, the windows, shelves and floor clean and the room well aired. There should be nothing but cheese kept in the curing room. If there are cap cloths or bandage cotton it should be kept neat and tidy. Do not use the curing room to keep empty boxes in or for a pantry or truck room.

After every shipment of cheese the shelves should be wiped with a damp cloth or scrubbed, depending on the length of time the cheese have been in and the condition of the shelves. The floor also should be scrubbed and kept clean, and the cheese, clean and neat, be placed evenly on the shelves gives the room a better appearance.

The factory should have a neat, tidy appearance from the outside. This cannot be done without the surroundings being tidy and clean. The wood being neatly piled, chips raked up, and all rubbish, such as boxes, barrels, hoops, etc., put out of sight.

The whey tanks should be kept clean and sweet both inside and out, and free from that strong, sour whey smell that they acquire from not being cleaned and allowing the whey to be spilled or leak out and putrefy. The tanks should be thoroughly cleaned at least once a week.

The cheese-maker and men should wear aprons and keep them clean. If the factory and utensils are kept clean and tidy, the men's clothes do not get dirty so quickly, and there is more pleasure and comfort in doing the work.

A man who does not keep himself clean, does not keep a clean factory; neither does a man who does not keep a clean factory keep himself clean.

The best results are not obtainable without clean and sanitary conditions at the farm, and also at the factory.

PRACTICAL CHEESE-MAKING.

By Alex. McKay, St. Marys.

In taking up this subject of cheese-making I find it very difficult to bring out anything new, or that will be of interest, as there has been so much said and written on the question of the making of cheese. But mentioning a few of the difficulties which we have met during the past season, their apparent causes, and how to overcome them, may bring out a discussion which may be of some interest.

You will all agree with me when I say that without a clean, sweet milk supply it is impossible to make the finest cheese. To my mind the most difficult task before us to-day is to get the average patron to realize his individual responsibility; or, in other words, to see to what extent he has the control of his profits in milk production. He is the only real producer of wealth in the trade, and his profit depends to a very great extent on the quality of the raw material furnished by him. One thing which struck me very forcibly the past summer as I visited the farms was the number of very poorly constructed stables, some of them totally unfit for the housing of cattle, as they were dark, and with no provision made for ventilation. As the cows spend almost one-half of their time in the stables, we cannot expect to have healthy animals unless we provide suitable stables. It will be very hard for me to say what percentage of the stables are in this condition, as I only visited places where I found the milk as it was delivered at the factory to be of inferior quality; but we can never hope to have a first-class milk supply so long as those conditions exist to the extent to which they do. Still another hindrance is the lack of proper cooling of the milk, and of suitable utensils, together with the proper care of the same.

It appears to be very hard to impress upon the average producer the necessity for cooling his milk. So long as it is accepted at the factory he is loth to put any extra labor on it, but if we are going to have milk delivered as it should be, it is necessary that it should be cooled immediately after being drawn from the cow to a temperature of at least 60 degrees. We are not able definitely to say how this should be done, as each patron has not the same conveniences for doing the work; but the most effective way is to have the cans placed in a tank containing cold water and ice, and to have the milk strained into the cans as it is drawn from the cow.

Now a word about the care of the utensils. I must say that in the last few years there has been very marked improvement in the cans sent to the factories; but still we have flavors that can be traced to the cans. This shows that the care of the milk can is still a vexed question. The milk producer is not altogether at fault, as I consider that the patrons are not treated fairly in the matter of the whey returned from the factories in the milk cans, when they are asked to keep them clean after the stuff that has been put into them from some of the whey tanks of this country. I think it is high time that there was something done to ensure the return of clean, sweet whey if we are going to have it returned at all. This can only be done by having the whey heated and the tanks washed every day. Then we will be reasonably sure that we are not distributing bad flavors through the medium of the whey, but will be co-operating to some extent with the patron in this great fight for clean, sweet milk for cheese-making, without which our progress will be very slow indeed.

Now just a word as to how to remedy the conditions of which I have been speaking. To my mind the only solution is to classify the milk. But the great question is how to do this. We all know that it is impossible for the cheese-maker to do this. However, there is another way which I think would work out quite effectively, and that is to inspect the premises of the milk producer, and if it is not found to be in a first-class sanitary condition, with provision made for cooling the milk, then place him in whatever class he may belong, and report to the cheese-maker, and let him keep him in that class until such time as the necessary improvements were made. By adopting this method, the good patron would simply be getting his own and not be compelled to help the fellow who will not help himself.

Now we come to the part of making the cheese. In the first place, I would like to mention one of the difficulties which we met during the past two seasons. This was cheese with a great many small round holes similar to gas holes, and to all appearances cut with acid. This occured in hot weather, when we were receiving a lot of over-ripe milk; and at first sight was rather difficult to account for. These conditions may be caused by moisture being left in the curd at some stage. When this is the cause, it is very hard to fully overcome the condition later on in the process. The first thing done was to set as sweet as possible, using a little more rennet, thus shortening the time required for coagulation, and then cutting finer. "But," you say, "that fine cutting increases the loss in the whey." I quite agree with you if the cutting is done with the ordinary knife; by using it several times we are not able to get the curd uniform, and there is a danger of losing the smaller particles. But to overcome this difficulty, we have a new quarter-inch wire knife made which leaves the curd uniformly small, and causes no greater waste than does the ordinary knife. I might say that we tested this thoroughly at the Dairy School last winter, and found practically no difference in loss between the two knives, and would strongly advise the use of the smaller knife where over-ripe or bitter milk is to be made up, as it leaves the curd in much better condition, and only requires to be cut three times, thus leaving the curd uniformly small so that the heat can be applied much more quickly, with less danger of breaking the cubes and causing a waste and roughness in texture.

We must always bear in mind that it is the heat in conjunction with the development of acid and action of rennet that shrinks the curd and expels the moisture. Then, if we are to have the very best results, we must study to keep those factors in the proper proportion, as an excess of any one of the three has its evil effect. If we are dealing with over-ripe milk, which means milk with the acid out of proportion with the other contracting agents, we must make conditions favorable for bringing about normal conditions as soon as possible. This can only be done by cutting finer, so as to allow for the contraction to take place in a shorter time, as we must, if possible, get the moisture properly adjusted in the curd, or cooked or firmed or any other term you may like to use; as, after all, the whole secret is to get the moisture and acid in the proper proportions before removing the curd from the whey or before the dipping point is reached. It is very hard to give any definite point where the dipping should be done. The only rule is to give sufficient acid so that the curd will mature in a reasonable time and give a reasonably close body, but not so much that it will prevent the moisture leaving the curd quite freely. I consider that the amount of acid at dipping determines to a very great extent the percentage of moisture retained in the cheese. For example: You have noticed a curd after dipping appear to be very hard—too dry. This is caused (if the curd is properly firmed) by allowing too much acid to develop before dipping. The curd has come to that stage where it is shrinking very rapidly, due to the amount of acid developed, and expelling the moisture at the same rapid rate, and the mere fact of not being able to get the moisture away from the curd as fast as it is being expelled allows it to mat and incorporate the moisture in the mass, thereby defeating the object which was had in view, namely a proper adjustment of the moisture in the curd and cheese; and then it is impossible to get rid of this surplus moisture at as little expense as you would have been able to do if the curd had been dipped with less acid. This is one of the greatest causes of dry, hard, and rough textured cheese, as we have made the mistake of getting our contracting agents out of proportion. I would like to impress on all cheese-makers the necessity of keeping up this natural fermentation and contraction of the curd, as you see here that the slightest mistake has the very opposite effect of that for which you are working.

Now, a word about stirring in the curd sink. Did you ever stop to think what moisture you were getting out in the process of stirring? For instance: If it were possible to take from the vat each particle of the curd separately, and dry off the surface, you would then have sufficient moisture left in the curd, and more than you are able to retain in the cheese, as you have not yet got those cubes as firm as cheese should be. Therefore you can plainly see that it is only the free moisture, or the moisture surrounding the cubes of curd that you are able to stir out, with the exception of the small amount of moisture that is expelled by the natural contraction of the curd due to the development of acid; and if the curd is sufficiently firm to stand the stirring properly, we have a continuation of the natural fermentation and expulsion of moisture with the least possible loss. To my mind there are more mistakes made from not stirring dry enough than from stirring too dry, provided the curd is in proper condition at this stage. As I said before we do not take the moisture out of the cubes of curd, but simply allow the free moisture to escape.

I am not in favor of rough handling of the curd at this stage, or in fact at any other stage, as rough handling tends to break the cubes and causes a needless waste; but the curd should simply be kept in a loose, open condition a sufficient length of time to allow the free moisture to escape, and not long enough to prevent it matting well. If this is not done, when the curd mats it is again incorporated and held till the curd is milled, and runs off in the form of white whey causing a very much greater waste than if it was properly dried.

There should be very little moisture run from the curd after milling as this is always attended by a much greater loss of both quantity and quality than is the case where the moisture is properly adjusted by the use of the agents which I have already mentioned, namely, development of acid in conjunction with heat and rennet action, and proper stirring at the time of dipping.

I would like to impress on the cheese-maker the necessity of training to exactness all along the line, and in conclusion would say that the man who makes his cheese the closest to the sweet line at all stages is the man who is the most successful and scientific cheese-maker, as he gets the finest quality and the greatest quantity from the raw material furnished him, which after all are the essentials in successful cheese-making.

HANDLING OUR CHEESE AND BUTTER AT THE PORT OF MONTREAL.

By George H. Barr, Dairy Division, Ottawa.

In Mr. McKay's paper he gave me the secret of his great success in making cheese. That is to have the curds properly cooked, and not to leave too much moisture. If there is any one thing that is hindering our cheese trade to-day it is leaving too much moisture in the curd or improperly cooking the curd. That is very prevalent in the far Eastern part of Ontario and in some sections in Quebec. Now I would say that although we have things in pretty good shape in Western Ontario, down in Montreal we find that there is a tremendous lot of work to do in Ontario and Quebec before we have all our cheese of the finest grade. You do not know anything about it here. I am not sorry that I have left Western Ontario, because after all you are only getting the price of our average Canadian cheese, and if we have a whole lot of second grade cheese, and a considerable number of third grade cheese, you are suffering; and if I can do anything that will help to raise the standard of the cheese in these districts I think I will be helping you in Western Ontario. My talk to-day is on the handling of our goods in Montreal. I want you to distinctly understand that I do not know all about Montreal, and I do not know all about the cheese trade or the butter trade. I do not know anybody in Canada who does. I know more about it than I did a year ago. I felt when I was coming back here to Western Ontario that I could not say very much to you here, even in connection with the handling of cheese in Montreal because I did not see many western cheese. My work as official referee brought me more in touch with the cheese from the Eastern part of Ontario, and principally from Quebec.

Mr. Barr then delivered a similar address to that given at Picton a week earlier, and reported in the proceedings of the Eastern Association, and continued:

Mr. Ruddick showed you the pictures last night and he said our competitors will be Irish and Siberian. We think we are an excellent dairy country, but when you look at that picture of Siberian butter and see that it was put up as well as any butter could be put up as far as the making of it was concerned, you will come to the conclusion that they are competitors with us; and that means that in Canada to-day if we are going to compete against them we must put the very best skill in at the manufacturing of butter or we will not be able to compete with these people. Do not think that because I have stated some nice things about your cheese that there is nothing more for you to do. I saw some cheese in Western Ontario last year that I was not proud of, and I felt ashamed that they came from Western Ontario. You are still making some inferior cheese here, and some inferior butter, and it is up to you, as cheese-makers and as milk producers, to see that the percentage of inferior goods from Western Ontario is cut down to a very small limit. You are doing well. I recognize that more now than ever, but at the same time you are not doing as well as you could do, and it simply means that you have to put all the skill you have into your work; and if you do that then you will still continue to lead in the manufacture of cheese.

I want to make one appeal to you: Don't build any more small factories. If you went down to Quebec and Eastern Ontario you would get some idea what it is to have small factories. Now I say, and I mean it, that if you are wise, and have your own interests and the interests of the dairy industry at heart, you will not build any more small factories in Western Ontario.

The reporters at Picton unfortunately reported me as saying that there was only two per cent. of the cheese that came into Montreal that could be passed at finest. I want all reporters here to contradict that, because I did not say it. I would be a little afraid to go to Montreal to-day, because that is not right. What I did say at Picton was, that I go through the number of cheese in each lot, or the percentage of cheese in each lot containing 100 boxes, and seventy boxes, and forty boxes. As far as I can remember there was only 6½ per cent. of the lots examined there that contained over 100 boxes. About 93 per cent. of the lots I examined contained less than 100 boxes, and I think it was 83 per cent. contained less than 70 boxes, and nearly 50 per cent. contained less than 40 boxes. What I did say was that these lots contained, generally, about a week's cheese, and when we remember that about 98 per cent. of the cheese I examined were under the first lot, I said it was easy to see that the majority of our inferior cheese came from small factories. I hope the reporters will correct that statement, for those cheese I am called on to inspect are usually cheese that have been either rejected or suspected by buyers. I am sorry indeed that it has been published, because I only saw a very small percentage of the cheese at all, in Montreal. What I wanted to say was that nearly all the cheese I saw, or was called on to examine as official referee, were from small factories, and for that reason I want to say that the small factories have a great deal to do with our inferior cheese in Canada. I do not want to say that a good cheese cannot be made in a small factory, but when you have a small factory you cannot get the best men to make cheese in them. If we are going to have nothing but the finest cheese in Canada we must have large factories with the very best and strongest and most capable men. If you are going to keep up the reputation in Western Ontario—and you are keeping it up because you have splendid men in the factories, and they are large faoctories—then you must keep on progressing.

A word about inspecting cheese in the warehouses. The cheese are delivered to the warehouses by the dairy transportation companies, and the different ways of inspecting the cheese is this: In some of the warehouses the first five boxes are taken off the dray and set aside, and the whole lot is judged from the five boxes, when the rest of the cheese are immediately wheeled into the cool-room, where the temperature is kept at about 45 degrees. In some warehouses the cheese are put into the cool-room and piled up in different sections, and the examination is made there, inspecting three or five or ten boxes. So now you can readily see that batches of bad cheese will slip through, and you are also liable to get one of the bad batches for inspection, and the whole lot is liable to be condemned on that account. One of the worst features of the inspection is that you cannot get an accurate test of a lot of cheese.

The weighing of cheese in Montreal is something we hear a great deal about. I had an opportunity of seeing the weighing done in the weigh-houses, and as far as I can see it is done fairly and accurately. Three or four gangs of men, three in a gang are employed, carrying their scales with them and weigh their cheese in the weigh houses. They weigh from five to ten per cent. of the cheese and butter in each lot, and the whole lot is averaged on that bases. I think you are well off in Western Ontario, in that you are having your weights inspected in the cars here, and you can have the inspection done on the shelves in your factories. In my work of inspection I run across some rather peculiar specimens of the human race, and some rather amusing ones. Unfortunately I cannot speak French, and a lot of the cheese I examine are from Quebec, and very often the cheesemaker is present. At one lot I examined the maker could not speak English, and I had to have an interpreter. I bored the first cheese and I said to the man "That is very open cheese," and I got back the answer, "That could not be so, because he was there till six o'clock every night." The next cheese I examined was gassy and had pin holes in it, and I said "This is open and gassy," and the answer came back, "Never had any gassy milk, and there could not be any gas in the cheese." The next one was very acidy and had a rough texture, and I said "There is far too much acid here," and he said "It cannot be that, because I never got any very ripe milk, and never set it very ripe." and the interpreter said, "He has got an excuse for everything," you cannot do anything with him."

I want to give you one receipt I ran across for food flavors. I was told this by a man who had spent some time in Quebec. This dairyman had quite a bit of trouble one spring with leeks, and the milk was returned three or four different times. It came all right for a day or two and then he found it was falling off in quantity each day. Some days he would send 120 pounds, other days 150 pounds. The maker met this patron on the road, and he said to him "Why is it that your milk is falling off so much in weight?" "Well," he said, "I will tell you, I came to the conclusion that cows are a good deal like people; some people cannot eat onions and others can, and I came to the conclusion some of these cows would not eat leeks and some of them would, and I thought I could fix that all right; so each night when the cows come up to be milked, and before I milked them, I go around and smell the breath of each cow, and I keep the milk of the ones that smell of leeks, and the milk of the ones that don't smell of leeks I send to the factory. (Applause.)

THE PRODUCERS' SIDE OF THE CREAM GATHERING SYSTEM.

By Mack Robertson, St. Marys.

Anything that may be said along this wide and varied subject must necessarily be in the form of a short criticism of the present methods by which this end of the business is carried on, and some few suggestions as to how the present conditions can be improved upon. I am sure no one will dispute the fact, that there is plenty of room for criticism. Improvement along this end of the industry is one of the most necessary things in the creamery business? Perhaps, no branch of our buttermaking system is carried on with such lack of business methods and knowledge. True, we are glad that we have some exceptions, but the exceptions are greatly in the minority class.

As I pass along I would like to say a few words about the cows kept by the cream producers. The cows represent, and are the support of our whole dairy industry, and yet, it is true that the great majority of cream or milk producers give this important question no intelligent thought or consideration from a dairy point of view. Many producers may size up their herd from the point of good-looking cows; but, few size them up from the point of a good-working cow—that is from what they can do at the pail. If producers would take hold of this question, I feel sure that the quantity of milk or cream supplied to our creameries could be more than doubled in a very few years with the same number of cows. Producers must learn to study each individual cow, to weigh her milk at each milking, find out what she is doing for him each day, each month and each year, and, by the use of the Babcock test, know exactly how many pounds of butter fat each cow is supplying him with. Thus, by knowing what a cow is yielding in butter fat for the time and feed spent on her, will the producer know whether she is a profitable animal or not. I fully believe that one-half the cows kept by our producers are not paying for the cost of their keep, and wherein is the profit in cows like these?

Again, our cows are not the only ones to blame. Some producers have good cows, but they cannot give milk without getting good food. The season just past has illustrated, at very great cost to the producers, how very necessary it is to make provision for just such dry seasons, by having a green crop such as corn or some green fodder to feed the cows in the dry season. A little forethought and good management would provide this crop, and if it were not needed it would still be profitable as fall or winter food. There is also great need for more silos for winter feeding, and especially is this true in the northern part of Western Ontario, where little or no provision is made for winter feeding. Many of our producers still persist in feeding turnips. This practice should be discountenanced altogether. No matter how carefully they feed them, some one is sure to overdo it, and the quality of the butter is spoilt, which means loss of money for the producer.

In milking and separating the cream there is room for more cleanliness and care. Cows should be kept clean and in clean places. The milker should be clean, both hands and clothes, and be careful to wipe off the cow's udder before starting to milk, and always milking with dry hands. In regard to the separators and separating, if we were to take a trip through some of our cream producing sections we would find separators sitting every place imaginable from hog pens to the kitchen. Some are in clean places and kept clean, being washed and aired every time they are used, while others are in filthy places and covered with dirt and filth and are only washed once per day. This is not as it should be, separators should be provided with a suitable building where the cream could be separated in clean, pure atmosphere, and the machine itself kept clean. Also there is need for better operation of the separators. Too much thin, sour cream is being supplied to our creameries, which is an injury to the quality of the butter made. A richer cream should be skimmed, as this cream would keep better, would be a less amount to cool, less load for the drawer, and less bulk for the buttermaker to handle, and the better quality of cream supplied would ensure better butter and better financial returns for the patrons.

One more very important point is the need of better cooling facilities. In speaking to a cream producer last week regarding the necessity of putting in a supply of ice for cooling his cream, he said that he only bought his separator so that he would be rid of the necessity of supplying ice. This, I know, is the erroneous idea of many of our cream producers. If they have a separator they think they have no more use for ice; they forget that it is necessary to cool the cream as well as to separate it. A greater mistake was never made, and it is a regrettable fact that the quality of cream supplied to our creameries has deteriorated since the hand separator has come into general use. This is not the fault of the separator, but the fault of the man who is using it. Ice in plenty should be supplied for cooling the cream, and the cost would be very little considering the benefit derived from its use.

In conclusion I would like to say that each buttermaker or creamery company must do more outside work amongst their patrons. Many patrons or producers are willing enough to do better if some one will only take interest enough in them to show them how and why. It will pay every creamery company or private owner to hire the buttermaker to start work one month before the creamery opens in the spring, and keep him out amongst the producers canvassing for cream, explaining the test, the methods of doing business and giving patrons instruction in skimming and caring for their cream. This work is sadly neglected, and yet, it would be a business proposition for the creamery, because the increased patronage and increased quality of cream supplied would more than pay for the buttermaker's extra wages. At many creameries none of this work is done, and no work would pay better. Patrons would then know the maker, and would be able to go to him for advice and the better quality of cream supplied, and increased patronage would more than pay for the labor and expense. Creamerymen must do this work if they ever expect conditions to improve above their present standard; and it is the creameries which are doing this work that are going to thrive and live.

CREAMERY SYSTEMS IN WESTERN ONTARIO, PAST AND PRESENT.

By Fred Dean, St. Marys.

In comparing the advancement which creameries have made during the past thirty years, as to conditions generally, we find that there has not been so much improvement as one would expect.

About the year 1878, there were a number of creameries started in the Northern district of Ontario at St. Jacobs, New Dundee, Ayton and Kirkton.

The method adopted at these creameries for paying the patrons consisted of the drawer calling each day at the different patrons' farms and skimming two milkings one day, and the patron skimming the next day, the cream being measured in shot gun or Cooley cans, there being no test. Each patron was paid alike according to the measurement and pounds of butter manufactured, after deducting five cents per pound for making. The cream was all gathered in wooden tanks and delivered sweet and clean flavored, owing to the cans holding the milk and cream being entirely under water and kept cold.

Old makers say that cream has never been delivered at the creameries in as good condition as when they first started to make butter, which does not speak very well for the present generation. In the year 1888, the first test was used for paying the patron according to the quality of the cream, called the Cherry Test, which consisted of a tin can the size of a quart sealer and a wooden shaker. A sample of each patron's cream was put in these tins and churned and when finished, the butter was weighed and the patrons paid accordingly. About the same time the Oil Test was first used, which consisted of small glass tubes holding a sample of each patron's cream taken, by the drawer, then churned, after which the amount of butter oil was read on a chart specially prepared. There are a few creameries using this test yet, but most of them have been superseded by the Babcock Test.

The first churns were barrel shaped with an up-right dasher, holding about 25 gallons of cream; these were used until 1884, when the box churn came into use. About 1898, the combined churns gradually took the place of the box, until now few creameries are without them. The workers used in conjunction with the dasher churns, were large wooden bowls for washing the butter. It was then salted on a triangular worker, partly worked, and left over night before finishing working. For the box churn, the Mason, Fargo and National workers were used.

About 1890, a few of the cheese factories began what was called the Separator System, in the fall and winter months, taking in whole milk and running it through power separators, this being the commencement of the separator system in butter-making.

In 1893, Winchelsea started a whole milk or separator creamery; then in 1897, the St. Marys Creamery Co. established one of the largest separator creameries in Canada, running it as such until 1904, when the hand separator became the craze, compelling nearly all the separator creameries to change back to the cream-gathered system, much to the detriment of the quality of the butter, on account of the poor care given to the separator and cream, and the length of time kept before delivering at the creamery. The creameries have been steadily increasing in number under this system, until now only an odd cheese factory is found among the group of creameries in the creamery districts.

In Western Ontario the District is divided into two groups, North and South, with about 73 creameries, two of these being the only ones left where the whole milk is separated and no cream-gathered cream taken; five creameries separate whole milk and take in gathered cream; four make cheese and butter both in the summer; the remaining creameries being strictly cream gathered or creameries where cream is collected from the patrons who do their own skimming, some using the hand separator, others setting the milk in cans, crocks, pails and pans, allowing the milk to sour and then skim the cream off by hand.

In the Southern Group there are 41 creameries; 27 of these or 65 per cent. are in first-class condition, having good buildings, cement floors, drainage and water supply good, with walls and ceilings painted or whitewashed every year. The equipment and utensils are kept clean and up-to-date, the majority have good refrigerators kept at a low temperature. The sanitary conditions are good, with surroundings kept neat and clean. Most of them are well managed, having a good butter-maker and managers who know their business; they produce a good quality of butter, and as a general rule give satisfaction to patrons and buyers of the butter. A large improvement has been made in some of these during the past season. The one thing lacking is improvement in the poor grade of cream delivered; but as long as two or more waggons from different creameries are run over the same routes, and one drawer takes what the other refuses, or the same price is paid for sour or over-ripe cream as that paid for good, clean and wholesome cream, little will be accomplished in improving the quality, as it is not through ignorance that this injustice occurs.

Of the remaining 14 creameries, 7 of them, or 17 per cent. are in a fair condition; some of them have good buildings, but poorly equipped, and poorer utensils to work with, drainage and water supply not good, while a good many of them have old wooden floors, none of them kept any too clean.

The refrigerators are in poor condition, and the temperature varies, depending upon the humor of the maker, whether he feels like filling it with ice often or once per week. The quality of the butter is never even, and a good deal of dissatisfaction is felt between the maker and proprietor. also between them and the patrons. These creameries could be greatly improved, either by a change of proprietors or managers, and a little expense and manual labor, with a good willing, thrifty, and energetic maker.

The other seven should not be allowed to have butter made in them another year unless some improvements are made. The buildings are old and unsanitary; they have poor drainage and bad water supply, most of the equipment is unfit for use, being old and never kept clean; the utensils are in the same condition, and not enough of them to do good work, even if the makers were inclined that way. Some of them are in barnyards and mud holes of the worst description. Some are old cheese factories that have outlived their usefulness in that line and have been made into creameries, while the stench of old whey soaked floors, tanks and surroundings can be detected long before they are reached. Some are in cellars, where the sun never gets a chance to show up their uncleanliness, and have a mouldy and close smell that makes it impossible to produce a good quality of butter, even if the cream was delivered in good condition. Lower prices are paid for butter at some of these creameries, and the quantity in some cases is greater than in the case of the better ones.

We are all aware of the fact that there are a good many things to be learned about butter-making and creamery management, to make a success of them. Therefore, to have a successful and well managed creamery, we must have at the head a butter-maker who has a thorough knowledge of, and who is interested in his work, ready and willing to learn and try anything new that will lead to the advancement and progress of the business and to realize that the interest of his employer, patron and creamery are bound together, and he needs to have tact and good judgment enough to know how to keep everything running smoothly and in harmony one with the other. The art of knowing how to get on well with the patrons is an accomplishment which every maker will find to be an invaluable asset. Few makers pay any attention to this part of the work, consequently they and the patron drift apart, each one trying to get all they can out of the other, instead of doing all they can to build up the central interest that they both belong to. "*Knowledge gives confidence, ignorance breeds suspicion,*" is truer in the dairy business than in any other line of business.

Monthly statements are sent to the patrons from some of our creameries that should not be tolerated. All that is given is the pounds of cream sent, pounds of fat, and cheque. No test given, nor pounds of butter from the cream sent, no price for which such butter is sold, etc. No annual or patrons' meetings are held to show the amount of business done or other transactions.

It is along these lines that a maker can make or break a creamery business. He should know each day what he is doing by keeping a careful record of the weight, tests, and condition of each patron's cream; also a record of his work, as to the total amount of cream, condition of cream at churning, the temperatures and acidity of it, from its arrival at the creamery until churned. If a poor grade of cream is received that could be improved by a little personal effort, that effort should be made. If there is some point about butter-making that is not clear, study it. We never get so near perfection that there is nothing more for us to learn, and after once getting a reputation it will be just as hard a fight to keep that reputation. It makes no difference how good a name a factory or maker has made, if the trade receives a few bad lots of butter from that factory, the name is gone, and the only way to be sure of getting the best price at all times is to have it always of the best quality.

It is generally conceded that a man who works in a position where intelligence and industry is needed will gradually fit himself to that position; but while at work at a trade where neither thought nor intelligence is needed, a man will gradually grow slow and dull, for the less he does the less he wants to do, until he finds himself incapable of performing any work right.

But we find men in the creamery business of all types. Some are clean, honest, skilful, painstaking and obliging, who command a good salary and are always sought after. Of these we have twenty-three men out of forty-one or 55 per cent., who understand their business, have had a good training and experience, before starting to manage a factory. Their personal appearance in most cases, corresponds with the appearance of their creamery; they are neat and tidy, and and keep everything about the creamery in sanitary condition. They take pride in their work, and are ever ready to learn and try anything that will improve the quality of the butter.

They experiment with the different suggestions given them, to find out for themselves the best methods of getting the cream cooled in a small space of time, the best temperatures to churn and wash at, to get quality and quantity.

Then we have ten men, or 24 per cent., who have had sufficient experience and education along the line of creamery management and butter making, who can make good butter and keep everything clean if they would try to do so, but become careless and indifferent, thinking anything is good enough so long as they get their time in, and get through with the work in some kind of way. This is especially the case if working in poorly equipped creameries. They cannot get the necessary supplies, or do not go the right way about it. No encouragement is given them from the owner or company to keep things in repair. They thus become careless and neglect doing their duty, overlook part of their work as to keeping pipes, floors, and utensils clean. The churn has a little warm water thrown in and a couple of revolutions given it, it is then called clean, until fault is found with the quality of butter. The churn is examined and yellow matter has been found from 1-16 to ⅛ of an inch thick all over the inside. Vats are found nearly as bad, strong odors come from every direction.

The refrigerator is at a high temperature, and things generally are kept in a bad condition. It is a safe assertion to make with this class of butter-makers, that they injure more butter and do more injury to the creamery business by "A lack of disposition than from a lack of knowledge."

The remaining eight makers, or 19 per cent., (along with the poor creameries) should not be allowed in the business. They are a stumbling block and detriment to the advancement of the butter-makers and to the progress of the industry. They are often the cause of the better maker quitting the work, by offering to work cheaper, and give guarantees that no man knowing his business would think of doing, because he has no control over the conditions.

These makers have not had enough experience before starting out for themselves, or have worked under a man who has not been careful enough in giving them training along clean or methodical lines. Some of them have no liking for nor take any interest in their work, but do it until some job turns up that they think they will like better, or earn enough money to give them a good time, clothes, and three meals per day. Some of them have never attended a Dairy School, and those that have, did not take enough interest while there to put into practice the scientific or practical things taught them. They seldom read dairy papers or attend dairy meetings, and a lack of thorough understanding of the principles necessary in making a good uniform grade of butter.

To improve the quality and standard of our butter, the first thing to recognize is the real need for improvement. So many makers never see any butter but their own make, and it is impossible to convince them of the need of improvement. One of the best methods used for improvement of the butter in the cream-gathered creameries was carried on at some of the creameries during the past season, where the pasteurizer was not used. The cream was cooled down to 50 or 52 degrees as quickly as possible, either by running it over a cooler or icing the vats thoroughly containing the cream, and churning within three or four hours after being delivered. This prevents the development of further acid and bad flavors, which is sure to take place if left over night, especially at a temperature of 54 to 60 degrees, which is the custom of a good many butter-makers.

The oily flavor that is found in so much of the cream-gathered butter is due to keeping the cream too long at, and churning at, a high temperature. When cream is cooled and churned at once this flavor is never noticed. It also helps to overcome the sour and rancid flavors due to old and over-ripe cream, by getting the cream into butter as soon as possible. By using the pasteurizer, the best all round satisfaction is given, especially if the cream is not too sour or over-ripe and testing over 25 per cent. fat. Where cream can be obtained under these conditions a pasteurizer certainly should be installed and used. A good culture is also essential, but owing to the difficulty of getting skim or whole milk, and the extra care that a cream culture takes, few of the makers use one continually. The cream in the vat should be stirred often to get an even temperature and acidity. If left without being stirred, the cream around and next to the cold water and ice will be colder, and thus develop less acid than the cream in the centre of the vat, which will be of a higher temperature, thus not giving an exhaustive churning.

The quality of the cream the past season has been quite an improvement over other years, showing better care as to cleanliness, and keeping the cream cool, but progess has been greatly impeded by a number of the factory owners having the cream hauled but twice per week, and in a few instances where extra care was taken of the cream only once per week. This should not be, and where the patrons are doing their part in taking good care of the cream the owner should not be so avaricious by taking advantage of this extra care to cutting down expenses and spoiling the quality of the butter.

In determining the amount of moisture in butter made by the different creameries the past season, the beaker method was used, and duplicate samples were taken in nearly every case. I made 187 tests which averaged 13.92 per cent. of moisture, 11 of these were over 16 per cent., highest 20.90 per cent., lowest 8.85 per cent. The temperature churned at, of those over 16 per cent. was from 52 to 54 degrees, and washed at 56 to 58 degrees; some of them were over churned in the buttermilk, and others allowed the granules to increase in size in the washing of the butter.

The butter that contained the high per cent. of moisture was of a dull color and had poor body and very open, though not as slushy as one would expect. The temperatures churned at by the majority of makers who had about the average test was from 50 to 52 degrees, to the size of wheat, spraying with cold water until the buttermilk was all expelled, and then washing once or twice according to the condition of the butter at a temperature of 52 to 56 degrees, until the granules were the size of corn. As soon as the butter was sufficiently drained and not too dry, one-half of the salt was sifted on as evenly as possible, the churn was then revolved without rollers a couple of revolutions and the remainder of salt added, with one or two more revolutions without rollers. The butter then should be worked four or six revolutions and allowed to stand and drain off surplus moisture for ten or fifteen minutes, finishing working with six to ten revolutions more depending upon the general conditions. No definite rule can be given for working butter, it being a part of the butter-maker's trade, which is very important; yet a good many give it very little attention, doing it more by guess work, causing mottles, streaks, greasy and open butter.

THE BUTTER-MAKER'S WORK.

By E. H. Webster, Chief Dairy Division, Washington, D.C.

I think it would be out of place for me to try to express my gratitude that I have been able to come this year and attend your convention. It certainly has been a pleasure to me. I have met with people whom I had heard of for a good many years in the dairy business, but whom I never had the pleasure of seeing, and it is a very great pleasure to know that you have so vigorous and strong an Association in Western Ontario, and that you are pushing ahead.

We on the other side of the line look to the dairymen of Canada, and particularly of Ontario, as leaders in many lines of dairy work. We have a great many men on the other side of the line who come from this side. They received their training from Prof. Dean and other teachers at your dairy schools, and they are right good sort of fellows, and we appreciate them. We have lots for them to do, and I wish we could get a lot more of you down there, because we need lots of good help on that side of the line.

To-day I bring you cordial greetings from the butter-makers and the cheese-makers of the United States. There are something like 10,000 of them altogether, and if each one could express his individual opinion, he would say the same thing as I have—that they look to Canada very often for assistance. We are working along similar lines. But I have had some of my ideals a little shattered by hearing some of the addresses and papers read at this convention. I find you have such things as bad milk and cream and bad dairymen, and poor cows, and some other things which I thought we had a mortgage on in the United States. It is somewhat of a comfort to find out I am not entirely in a strange land, and I feel more at home when I find you have some of these problems to solve which we are meeting with from day to day.

This is a matter that concerns the whole world; and when we come to consider the needs of humanity, and the means of feeding the human race, we find that we are all akin—we all need the same thing, and we are all running up against the same problems. We find that the question of dairying is as important from an agricultural standpoint as from any other question of agriculture. It fills a greater place, perhaps, than any other question, and the men who are working in the factories, manufacturing butter and cheese, have a great part in this problem of agricultural work. But I want to talk to you this afternoon about the work of the butter-makers in the factories.

The question of good butter is of more importance than is sometimes thought. In its manufacture the farmer, the maker, and the consumer are alike interested. The producer, in getting a fair price for his product; the manufacturer, in finding a ready market; and the consumer, in getting quality for his money. The three are so closely associated as to be inseparable. What influences one will react on the other, and under normal conditions of trade the butter-maker holds the key that opens the way to the successful accomplishment of the purposes of each.

Fine butter creates its own demand. The average household will consume about the same quantity of butter for cooking purposes throughout the year. The same family will vary materially in the amount used on the table, and this variance will be measured almost solely by the quality of the butter furnished for such use.

It will be seen that the demand that may be created for butter beyond that made by an ever-increasing population, and prosperity, must be through catering to the appetite of the consumer, encouraging him to eat more butter because of its good, wholesome flavor and taste.

There is in the markets a constant shortage of high-grade butter, and fancy grades that run uniform in flavor, body, color and salt, sell at a marked advance over the common grades. A market is assured because the consumer cannot satisfy his demands under present conditions.

The farmer is entitled to all he can get for his butter fat. Just how much that will be will depend upon at least two important factors: his ability to produce and deliver to the creamery a superior article of cream, and the efficiency of the factory to turn this to best account. Too often the first of these factors, apparently, fails because under stress of competition or otherwise, the creamery does not discriminate in price between good and bad cream. Such failure to draw a definite line means, ultimately, that all the patrons of such a creamery will be forced to take the price of poor cream. Any temporary gain secured by the individual selling poor cream will be disastrous to the whole community sooner or later.

The efficiency of the creamery management to make the most of the products with which it works also measures the ratio return to the producer. The creamery operator who can make 120 lbs. of butter from 100 lbs. of butter fat as compared with a neighboring creamery's 110 or 112, has from 8 to 10 lbs. the advantage on every 100 lbs. of butter fat purchased, and can give correspondingly greater returns to the patrons.

To what extent is the butter-maker responsible for the quality of cream delivered at the creamery? The amount of butter that may be made from a unit of butter fat? The price this butter will bring on the market and the building up of a greater demand for fancy butter? Before these questions can be answered the butter-maker's position must be fully defined. The creamery, unlike any other manufacturing plant, is unable to select its raw material from an unlimited field. This localizing of territory from which supplies can be drawn limits the power of selection, and to that extent limits the ability of the creamery to manufacture a fancy article, to the ability and willingness of the producer to furnish the necessary grade raw material. In almost every other business the manufacturer, if dissatisfied with his materials of manufacture, can turn to other sources until he is satisfied. He can control the quality of output of his plant according as he has ability to make this selection.

The area from which cream can be bought, with profit to the farmer, cannot be extended beyond the limits of transporting from the farm to the creamery in a few hours. When the distance is so great that the cream cannot be in the cream vats ready for churning the same day it leaves the farm, there is little hope for the quality of the butter.

The successful creameries are those in which the butter-maker can come in personal touch with the producer of the raw material, and by such close relation, by wise counsel, and firm policy, constantly raise the standard of quality through such methods. The inability to select a patronage must be more than offset by his ability to control the patronage that is his by force of circumstances, and through such control secure an article that will return the greatest profits to the producer. This would appear to be the first work of the butter-maker, and the success of all future operations, so far as quality is concerned, will depend upon his ability to do this work in a masterful way. To perform this duty the butter-maker must be a good judge of quality of cream. He must be able to impress his judgment upon the patron in a way that will bring confidence and desire for improvement; he must be firm, impartial and just to all; the results of his work in grading, testing and weighing should be accepted because of his ability and honesty; anything less than this will bring discredit and ultimate failure.

The butter-maker from this standpoint certainly holds a most responsible position, and it is this part of his work that will test his ability more than any other; because in this, the faculty of getting along, tact, diplomacy. and all those qualities which mark the successful man in business will be shown.

It will be seen from this that the term "butter-maker" is inadequate, incomplete, and fails to convey a satisfactory idea of the position and duties of the man who goes by that name. It is unfortunate that a name with so narrow an abstract meaning should have come to be applied to so important a position. There is much in the dignity of a name, and it is entirely possible that a profession may not expand to its fullest breadth and become what it should because of an unfortunate selection of its name. Who can say that the butter-makers to-day would not have a broader conception of their work, and that the teachers of butter-makers would not have had broader conceptions of their duties had a term been created for the position now called "butter-maker" which had in its conception and meaning more than the mere act of making butter? And that, out of such a conception, there would have come a broader and higher plane of creamery work which would appeal to better men to enter the ranks and have better results obtained for producer and consumer alike?

Nearly every industry of the farm to-day has passed from the control of the farmer through the reduction of his work to the mere producer of raw material. The man who makes and sells the finished product controls the market for these raw materials, and often through combination and discrimination is able to fix the return that the producer should receive. The only product of the farm of any great magnitude still in the control of the producer is the manufacture of butter and cheese. The perishable nature of the raw materials makes it impossible to concentrate the business at any one point, except to a very limited extent. As the success of a business does not rest solely on the immediate returns to its promoters, but rather on the ability to produce lasting returns based on quality at a minimum cost to producer and manufacturer, the incipient attempt to centralize the dairy business and remove from the farm the control of the most important of its product is bound to fail. Any seeming temporary success in this line has its foundation in the inability of the butter-makers of the country to properly perform the duties with which they are entrusted. These duties are not considered seriously by some men who are making butter. This class are simply packers and scrubbers; they neither know the principles underlying their work nor care for their trust to their employers.

The man in a store or a bank who would handle 25 cent pieces as carelessly as any butter-makers handle pound weights of butter would be immediately discharged; yet, is it a greater sin to throw away $5 a day in coin of the realm than it is to throw away the same value in butter? The butter maker who thus wantonly wastes the butter fat in his keeping to the extent of hundreds of dollars per month, would suffer immediate discharge should he be unable to show the balance of cash his books called for each night. The illustration may be brought still closer to the butter-maker's work. He is held strictly accountable for every pound of butter taken out of the churn. If the day's operations have produced 500 lbs. of butter, and he can the following day account for but 495 lbs., the chances are he will be required to make good; but, if from 420 lbs. of butter fat bought that day he makes only 480 lbs. of butter when he should have made 504 lbs., neither he nor his employer think anything about it. And yet, here is an actual loss of 24 lbs. as against 5 lbs. in the former case. This exaggerated difference between the idea of value in a silver coin and value in a given amount of butter fat having exactly equivalent worth of the silver coin and interchangeable, under trade conditions with it, is a difference of education.

Here, again, the work of the butter-maker must extend beyond the scrubbing of floors and the packing of butter. His responsibility extends to the keeping of account of every pound and fraction of a pound of butter fat given him to manufacture into butter, and his knowledge should be sufficient to enable him to calculate, in advance, the exact outcome of his operations. Butter of uniform composition and flavor from day to day will require in its manufacture the ability of the best men who will go into the business. Only such results should be tolerated by the employer, and if the farmer is to realize the most for his product he must insist on only such methods being employed as will bring these results.

A careful study of the butter as it arrives on the markets reveals the fact that there is very much careless, indifferent work being done in the creameries. Government inspection reports show that many, if not the greater part, of the faults found originate in the creamery, and are due to lack of wormanship on the part of the butter-maker.

Reports of the operation of the creameries show that the great manufacturing industry known as butter-making is in a very crude state of development. There is no systematic standard of operation as there is in banking, merchandising, or in many lines of manufacturing. It can be shown that in very many creameries the only decently kept record will be the milk or cream sheet recording the weight of milk or cream delivered by the patrons; every other operation of the creamery is unrecorded, even to the weight of butter shipped to the commisison house.

This is a serious situation, and it is an interesting speculation as to just where the blame may be laid for this condition of affairs. Such speculations will not solve the present difficulty. It is evident that there must be established a higher standard of requirements to be met before a butter-maker is eligible to appointment as the head of a creamery. This standard will require a very much better technical training in the dairy schools than has been given in the past, and a wider experience in practical work before the butter-maker can hope to assume the responsibilities of his position. In other words, the grade of school work must be raised, and at the same time less dependence put upon it to make a butter-maker.

To those who believe in the perpetuity of the local creamery system, either individual or co-operative, this is said in all seriousness. There is in various parts of the country a steady development of the centralization of the creamery business. The only point of advantage this system has is in the use of strict business methods in the factories. Their methods of gathering cream are the crudest ever devised, and only result in paying a premium for the poorest cream. The only purpose of bringing the centralizers into this discussion is to show that they have made the business of manufacturing butter a science, and that in the technique of manufacture they are years ahead of the average local creameryman and the dairy schools.

The average dairy student or butter-maker of years of experience in local creamery practice going into one of these churning plants finds that he has to unlearn most of his store of knowledge and begin all over again. This is so true that the managers usually prefer to select help that has never been inside of an ordinary creamery or a dairy school. A green man can be more quickly taught the work of pasteurization, cream-ripening, churning and packing, where everything is done by exact system, than can the man who has had a training or experience that has taught him that system cannot be used in creamery operations.

It might not be a bad idea to have our dairy schools stop the making of mere butter-makers and give courses in creamery superintendence. It is quite possible that if creamery superintendence had been the cardinal subject, instructors would have long before this realized the vast difference between making a churning of butter—treating it solely as an individual—and the making of a series of churnings, all of which must tally in their results. The perplexing problems of churn yield and uniformity might to-day be easily controllable by butter-makers, instead of being one of the most vexatious questions, had the early viewpoint of the teachers been different. It might be well if the creamery owners, the dairy press and the butter-makers themselves would grasp this broader view of the work of the man who runs the creamery.

The creamery superintendent of the future will be the butter-maker of the present working along broader lines. He must be expert in the science of making butter; he must be enough of a business man to recognize the full value of records; he must be diplomatic and tactful enough to compel the delivery of good milk and cream; he must be given enough assistance so that these greater parts of his work may be done thoroughly and without too much hurry; his assistants will do the less important work of manipulating machinery, scrubbing, and handling of cream and butter; all this work will be done under the creamery superintendent's watchful eyes. The helper of to-day will be the butter-maker of to-morrw, when the butter-maker has become the creamery superintendent. The dairy schools will no more think of taking students in order to teach them to operate the separator, churn, or to pack butter than does the agricultural school to teach them to plow a furrow or put up a stack of hay. While these things may come incidentally, the work will be the teaching of the underlying principles of creamery practice. It may still be necessary to teach the art of butter-making, and this will be worked out along the lines of trade school instruction.

And those who have furnished such a course will go out not as creamery superintendents, but as butter-makers or the equivalent of second man in the present method of organization.

This broader conception of the work of the butter-maker will mean a higher standard of wages. To this many creamery companies will object, claiming that they are already paying all the traffic will bear. The records of a thousand creameries taken at random in the United States will show that in 90 per cent. of them employing cheap men, the losses by so doing would amount to double the butter-maker's salary each month. The losses are not always due to lack of knowledge or of interest on the part of the butter-maker. In many cases the company does not employ sufficient help, making it impossible for the butter-maker to attend to the most necessary part of his work. His whole time must of necessity be taken up with the rougher part of the work that could be done by a beginner in the business. This short-sighted policy is costing the creameries of the country many hundreds of thousands annually.

Statistics amply prove that under conditions such as have been described the creameries of the country are prosperous, and as a rule the patrons are well paid. Could, however, better methods of manufacture and business be generally put in practice it would mean millions in addition to this greatest industry of the nation.

Enough has been said to indicate that the work of the butter-maker—or, better, the creamery superintendent—is a most important factor in the success of a creamery. In ordinary practice his position makes him superintendent, manager, butter-maker and helper, all in one; and he is so frequently loaded down with work that none of these duties can be performed thoroughly.

He owes it to the owners of the creamery that he be qualified for this position by sufficient training and experience to perform the duties thoroughly and with profit to the concern. The owners owe it to him that they be willing to pay for this service its true worth, and to employ enough assistance that his work may be properly done. With this happy combination of events, the producer would realize more than ever on his product, and the consumer would profit by securing a much higher grade of butter for his table.

This may seem a rather optimistic ending for so pessimistic an address, but it is within reasonable hope that with the dairy schools and the dairy press and the field instructors and inspectors all working towards this end it may be accomplished.

THE CREAM GATHERING CREAMERY.

By Prof. H. H. Dean, O. A. C., Guelph.

We are highly honored to-day in having with us the Chief of the Dairy Division of the great Republic to the south of us. I have had the pleasure of meeting him several times at dairy conventions in the United States, and have always found him well informed, a man who is able to express his ideas clearly, and a man who is doing excellent work in the United States. There is just one thing I would take exception to in his introduction, and that is he said he hoped more Canadians would go over into the United States. I object, Mr. Chairman, very strongly to Uncle Sam taking any more of our Canadian boys. (Applause.) I believe we can find work for all of them here in Canada, and I believe the day is not far distant when we will pay them just as much money and give them just as good a time as they can have with Uncle Sam.

It is related of Phaeton, son of Sol, who got leave to drive the Chariot of the Sun for one day, that his father (the sun) admonished him somewhat as follows: "Do not ascend too high, or you will burn the heavenly mansions; do not descend too low or you will reduce the earth to ashes; do not drive to the right or you will meet with the constellation of the Serpent; avoid going too much to the left or you will fall in with that of the Altar. *Keep in the middle.*" In spite of these directions Phaeton, by his unskilful driving, upset the chariot, setting heaven and earth on fire, and was hurled by thunderbolt from Jupiter into the River Po. Mythology further tells us that from the tears of his sisters amber was created.

While we do not anticipate, on the present occasion, any such calamity as befel the son of Helios, a speaker who appears year after year before this august assembly of the dairymen of Western Ontario is in great danger of upsetting the dairy chariot, or of running into one of the great constellations which hover along the milky way. However, with your permission, Mr. Chairman, I shall try to control the steeds of fact and fancy, achievement and imagination in such a way that as little damage shall be done and as much good as possible shall be accomplished during our half-hour drive in the dairy chariot along the milky way of imagination, but the creamery and cheesery road of hard fact.

Sometimes we are able to obtain a better view of ourselves and of our subject by contrast than in any other way. We shall, therefore, treat of the subject in hand by contrasting the butter and cheese business as a whole, then in particular, with reference to patrons, makers, factories and products.

Taken as a whole, the cheeseries of the Province seem to have flourished better than have the creameries. This is largely due to the fact that cheeseries have been able to pay higher prices for milk than have the creameries. This, too, rests upon a commercial fact, viz., that cheese contains more nutritive material than does butter. In the process of cheesemaking, in addition to the water of milk, which probably has at least a dietetic value. two of the chief compounds of food value in milk, viz., fat and casien, are made into the substance known commercially as cheese. There are also other constituents of milk found in cheese in minor quantities. Cheese may be considered as the chief dairy food of the working man, as it furnishes material for building muscle as well as material for heat and energy.

Butter, on the other hand, is largely a fuel food, *i.e.*, it furnishes material for heat and energy but does not supply muscle-forming constituents. To a certain extent, butter is a luxury for the workingman. When it becomes too high in price, the economical housewife with limited means tries to get a substitute such as "oleo" (in some countries), fat meat, gravy, drippings, etc. Because of these facts, the market must always be more limited in large populations for butter than for cheese. The consumer may not understand much about the chemistry of foods, but he or she knows that substitutes for butter are more easily and cheaply obtained than are substitutes for cheese and milk.

From a purely commercial food viewpoint it would seem as if the cheese business is likely to be more stable than is the butter trade. On the other hand, we need to consider the effects of these two branches of dairying on soil fertility, which after all, is the basis of agricultural prosperity. Byron said, "As the soil is, so is the heart of man." On thin, worn-out soils, the butter business is undoubtedly the best form of dairying. Many sections of the Province are carrying on the cheese trade at a great sacrifice of soil fertility. The natural conditions are much more favorable for buttermaking. It would be wise if such districts would confine their efforts entirely to selling cream or butter and allow the cheese to be produced on the richer clay lands, such as abound in Oxford county. Many farmers on light, thin soils, are sacrificing future prosperity for a present gain. How hardly shall they that impoverish the soil dwell in happiness and comfort on the earth or inherit the future kingdom! Conditions of soil and roads, methods of farming and inclinations of the people, ought to be strong factors in deciding whether cheese or butter shall be manufactured in a district. Where the soil is light and the roads not good, especially where the people are inclined to make a strong feature of other lines of live stock, besides pure dairy stock, the creamery is undoubtedly the best form of dairying to follow. On the other hand, where the soil is rich, the roads fairly good and the people are inclined to specialize in dairy stock, then the cheese business is likely to be most profitable to the farmers and to all concerned.

Before leaving this general question we should like to call attention to the following item in a leading Canadian trade journal of recent date:

"With a big decrease of 294,613 boxes of cheese and 193,734 boxes of butter in our exports this season to date, the question may well be asked if our export trade in dairy products is not on the road to final extinction, similar to the change in the same direction as that which has taken place in the United States, in its butter and cheese exports?" After speaking of the fact that it is difficult to account for this decrease in dairy exports, the article concludes; "Surely we cannot afford to dispense with an export trade that has brought the farmers of this country a revenue of $23,000,000 to $26,000,000 a year."

The foregoing comments should cause all those connected with the dairy business to stop and consider very carefully, what should be done in order to stop this progress to "final extinction." We may very well ask ourselves if the farmer, the cheesemaker, and the buttermaker are getting their fair share of the profits in the business. Have the workers been having "a square deal?" Has there been an undue share of the profits diverted into illegitimate channels? Why are many of the best cheese and buttermakers leaving the business? What is to become of the business when the making is left largely in the hands of inexperienced men? These are questions which must be answered, and conditions which must be changed, if we are to continue the export dairy trade along profitable lines.

Patrons of Creameries and Cheeseries Contrasted.

Patrons of both must have good cows in order to produce milk or cream profitably. For the creamery, we need cows which will produce from 300 to 500 lbs., or more, of butter annually. For the cheese factory we need cows producing from 10,000 to 20,000 lbs. milk, or 1,000 to 2,000 lbs. cheese annually. A leading American dairy journal said recently regarding the new Hart casein test, that it promised to do for cheesemaking what the Babcock test has done for buttermaking in developing a special butter cow giving milk with a high percentage of fat. The writer goes on to say that he sees no reason why a special cheese cow may not be developed, *i.e.*, a cow which gives milk containing a relatively high percentage of casein. We are pleased that the position which we took some fifteen years ago, that milk for cheesemaking should be paid for on a different basis from that which is adopted for the payment of milk for buttermaking, is now being recognized as the correct one.

At present, patrons of cheeseries are at a disadvantage as compared with patrons of creameries in the matter of a just system of dividing proceeds from sales of products. Almost invariably creamery patrons are paid according to the butter value of milk or cream, while patrons of cheese factories are paid chiefly according to a system which places a premium on dishonesty, or else are paid according to a plan which places too great a premium on but one milk constituent, viz., the fat. It is well known that both fat and casein of milk are essential in the manufacture of cheese, and both these constituents should be recognized in any system adopted for paying patrons of cheeseries. It is little wonder that some of the best patrons of cheese factories have withdrawn their support from an institution which has for its motto, "Every man for himself and the devil take the hindmost." We welcome the advent of a test which enables a person to ascertain the percentage of casein in milk quickly and accurately.

The patrons of creameries have an advantage over patrons of cheeseries in that the by-product (skim-milk) is a more valuable food for stock than is the by-product whey, from cheeseries. As the importance of live stock interests grows, the importance of skim-milk for young stock will be more appreciated. The relative food values of skim-milk and whey is probably 4 or 5 to 1; i.e., if whey be worth five cents per 100 lbs., for feeding purposes, then skim-milk will be worth 20 to 25 cents per 100 pounds. Some would place whey as being worth not more than one-third the value of skimmilk.

Wherever these by-products are, the result of mixing milk from various farms in the process of manufacture, it is very important that the whey, skim-milk, and buttermilk shall be pasteurized before returning to the farm, in order to prevent the spread of bad flavors, but more particularly to prevent the spread of disease. The heating of whey, etc., to 160 degrees to 165 degrees F. will destroy most of the bacteria found in milk. Especially is this true when the heating is continued for one-half hour or more.

As a rule, patrons of cheeseries supply better raw material than do patrons of creameries, more particuarly patrons of what are known as cream-gathering creameries. Poor raw material is the weakest part of our butter-making industry. How to get an improvement is one of the greatest questions confronting our creamerymen. Probably the most effective plan yet devised is to grade the cream and pay a price according to the quality or grade. Not more than two or three grades should be made and for each grade there should be a difference of one to two cents per pound fat or butter.

For first grade we should suggest a standard somewhat as follows:

1. Cream must be sweet, clean flavored, and test not less than 25 per cent. fat.

2. It must be delivered in individual cans not less than three times a week.

Second grade cream would be all cream which could not be graded as first. In case a third grade were deemed necessary, the advisability of which we very much doubt, all thin, sour cream of poor flavor should be put in this class, but it would be better not to accept such at all.

From our own practical experience, we should judge it impossible, or nearly so, to sucessfully carry out any system of grading cream unless all the creameries in the district will adopt the same method. Co-operation, not competition, is essential in order to improve the quality of the raw material furnished to our creameries.

One other point. It would be advisable for patrons of both cheeseries and creameries to provide a supply of ice, but for those sending cream to our creameries it is almost essential that they have a large supply of ice for cooling cream. Now is the time to lay up a store for next summer's use. Provide about one ton of ice for each cow you expect to milk next summer. This need not cost over one dollar per ton, or ten dollars for ten cows. It will prove a profitable investment for all patrons.

MAKERS CONTRASTED.

We are aware that "comparisons are odorous," but at the risk of injuring some person's feelings we should like to contrast the men now responsible for the making of cheese and butter.

A few years ago, possibly at the present time, the cheesemakers of Western Ontario would compare very favorably as a class with any body of men belonging to similar trades or professions. There remains still, a number of excellent men in charge of our cheese factories, but many of the best men have left or are leaving the business. Then again, the younger men do not seem to be qualifying for the responsible position of manager of a factory. About fifteen years ago, when the Dairy Schools were established, they were crowded with cheesemakers anxious to learn the latest and best methods. Some of our best men went to the United States before there were any Dairy Schools in Canada. At this time there were very few buttermakers at the Dairy Schools, other than those who were making butter in cheese factories during the winter.

What is the condition to-day? At our own School in connection with the Ontario Agricultural College, the buttermakers outnumber the cheesemakers, yet we have probably ten times the number of men engaged in the manufacture of cheese as compared with buttermakers. Who among the cheesemakers are preparing themselves to take the places of men like Adam Bell, "Billy" Bothwell, John Brodie, The Travis boys, "Tom" Grieve, The Boyes boys, and others who might be named,—men who fitted themselves for their work in the best way possible? These men, in the natural course of events, must soon pass off the stage of action. What will become of the great Canadian cheese industry if the coming generation do not think it worth while to obtain the best possible training in order to fit them for their life's work? These are serious questions for this Association to consider.

We are free to say that the men engaged in the actual making of our dairy products are not sufficiently remunerated for their long hours and heavy work. As regards the work of the two classes, we may say that buttermaking is undoubtedly lighter, pleasanter, and less nerve-racking than is cheesemaking. Cheesemaking requires more muscle, more skill and longer hours and consequently, the cheesemakers should receive higher pay. Both deserve more pay than they receive at present, but if any differenc is made it should be in favor of the cheese-maker. But in no case should a second or third class man expect to receive first-class pay. A man should be rewarded according to his skill, knowledge, honesty, and faithfulness to duty.

FACTORIES.

I need say very little by way of contrasting the buildings in which butter and cheese are made, as this is fully dealt with in the report of the Chief Instructor. There are two points which need special emphasis, viz., that new buildings should be constructed with a view to controlling the temperature, having good ventilation, durability and convenience; and secondly, that dairy buildings need constant repairing else they soon become unsanitary. In addition, provision must be made for the proper disposal of the sewage. As this subject is also fully dealt with elsewhere we need not dwell upon it.

While nearly all are agreed that the change from the whole milk to the cream-gathering form of creamery has not been in the best interests of improving the quality of our butter, the cream-gathering creamery is here to stay, for a time at least, and we may as well plan our buildings accordingly. Where the whole milk is delivered at the creamery or cheesery we must of necessity have a much larger building than where cream only is delivered: hence, in the latter case, a portion of the funds devoted to a larger building should be used in improving the durability, convenience, and sanitary conditions. We are bound to say we have not yet seen what might be called a model creamery or cheesery.

FINISHED PRODUCTS.

We have already pointed out the fact that cheese has a higher nutritive value as a food than has butter, and that it is more likely to be the food called for in larger quantities by the British workingmen and purchased by the economical housewife, who has limited means for the purchase of food. In Canada, however, cheese is regarded more as a luxury, a dessert food, etc., while butter is the more staple article. As our foreign population increases we shall probably see a change in this respect because of the fact that Europeans are cheese eaters.

We have this suggestion to offer to cheesemakers, that they stir their curds less so as to retain more of the milk solids. A New Zealand cheesemaker on this point says: "The toil of the cheese-maker is enough without adding this infernal device to break his back and give him cramps in his stomach." From our experiments conducted on this point we feel satisfied that Canadian cheese-makers are making for themselves unnecessary labor and losing valuable cheese-making material by so much stirring of the curds. If the work previous to the removal of the whey has been properly done it is not necessary to stir curds so much as is commonly advised. Make a few experiments and note results.

We have another suggestion. Many makers mature their curds so much that much unnecessary loss of fat occurs. Again we would say that if the work previous to salting has been properly done it is not necessary to wait four, five, or six hours after dipping, before the curds may be salted.

By modifying the method of making cheese on these two points we feel that a finished product will result which will better suit consumers and one which will better compete with European cheese; besides it is less laborious. We do not advise any radical changes in methods of making, but throw out these hints to be followed so far as practicable. Cheese and butter-makers need to study the wants of consumers. The middle-men are not always safe guides as to what the people want in the way of food.

If we are to export butter it would seem that we should turn our attention almost wholly to the making of unsalted butter. A leading firm of London, Eng., to whom we made experimental shipments of butter during 1906 and 1907, in reply to our inquiry as to whether or not the addition of salt to butter for London market had a deleterious effect, say in a recent communication: "On a market in which the supply of salted and unsalted is about equal to the demand for each, the difference in value between an unsalted butter, and the same butter to which, say 2 per cent. of best salt has been added, would be about two shillings per hundred weight. The risk with unsalted is owing to there being considerably less buyers for saltless than for salted, and every now and again the supply of saltless is in excess of the demand, and has to be sold at a considerable discount on the price of salted."

In our own practical experience in sending butter to London, Eng., market during the past two seasons we have received about two shillings per hundred weight more for the unsalted butter as compared with similar lots salted. In some cases, boxes of butter which were unsalted sold for two shillings per hundred weight more than did boxes out of the same churning which were salted.

In most of the unsalted butter some form of a preservative was used. We found that common powdered borax gave as good results as did any of the more expensive commercial preservatives. The quantity of preservative used varied from one-quarter to one-half of one per cent., i.e., to 100 pounds butter we added from one-quarter to one-half a pound of borax, either in dry form or dissolved in water. Sometimes the preservative was mixed with salt. Full details of these experiments will be found in the Annual Report of the Ontario Agricultural College for 1907.

In conclusion let us all do what we can to improve the dairy products of 1908, but more particularly the products from our creameries.

THE NEW CASEIN TEST AND ITS RELATION TO THE DAIRY INDUSTRY OF ONTARIO.

By T. Herbert Lund, Madison, Wis.

I am here this afternoon to give you an explanation and demonstration of the new test for casein in milk, recently got out by Prof. Hart, chemist of the Wisconsin Experiment Station.

The multiplication of tests during recent years is an encouraging sign, indicating, as it does, a desire on the part of those concerned, for greater knowledge of the products they handle in order that they may carry on their operations to the best advantage.

Looking back to the year 1890, we find the first practicable test for fat in milk introduced—the Babcock test. About the same time, we get the Harris rennet test. Five years later, the cheese-maker is enabled to pick out the poor milk by means of the Wisconsin curd test. 1905 saw the introduction of the acidimeter into Ontario creameries and cheese factories. The past year has brought forth three practical, rapid, and accurate tests for moisture in butter and cheese: the Gray moisture test, the Patrick aluminum beaker method, and the high-pressure oven. And now, most recently, we have the Hart test for casein in milk.

Before discussing the details of the test, I wish to say a few words about casein and the proportions in which it is found in milk and milk products.

Table No. 1. Average Composition of American Milk.

Water	87.5	Casein	2.5	Sugar	5.0
Fat	3.6	Albumen	0.7	Ash	0.7

Table No. 1 gives us the average composition of American milk. These two constituents, casein and albumen, are classed as proteids or flesh-formers. They are nitrogenous bodies of complex chemical constitution, and though alike in some respects, have important differences. The casein is found in milk partly in suspension and partly in solution, and is coagulated when treated with rennet or dilute acids. The albumen is found in solution, but unlike casein, is not coagulated by rennet or dilute acids. It is upon these facts that the casein test is based. The casein is coagulated by dilute acetic acid and separated in such a way that its volume can be measured, while the albumen remains behind in solution.

Let us now briefly consider the relation of the casein to the butter and cheese industries of Ontario.

The composition of creamery butter shows us that usually it contains 1 or 2 per cent. of curd. and this indicates that casein is practically valueless in the manufacture of butter. If you figure it out, you will find that about 94 per cent. of the casein in the original milk is returned to the farm in skim-milk and buttermilk.

When, however, the milk is used for cheese-making, we find that casein plays an important part. Chemical analysis shows that a well cured Cheddar cheese contains about 34 per cent. of water, 33 per cent. of fat, and 26 per cent. of casein compounds, while the analysis of whey shows about 3 per cent. fat, 1 per cent. casein, 4 per cent. albumen, and 5 per cent. sugar; thus showing that while practically all the albumen and sugar is lost in the whey, about 92 per cent. of the fat, and 96 per cent. of the casein contained in the original milk is retained in the cheese. For this reason, every farmer who hauls milk to a factory to be made into cheese should take an intelligent interest in casein and its relation to cheese yield in order that he and his fellow patrons may obtain just division of the profits according to the value for cheese-making purposes of the milk delivered.

The subject of payment for milk at cheese factories is by no means a new one, although recently up for discussion again in certain of your dairy papers. As far back as 1891 (if you look up your Hoard's Dairyman for that year) you will find Dr. Robertson at the annual meeting of the N. Y. State Dairymen's Ass'n advocating payment on the basis of quality. During the early nineties, several experiment stations made extensive investigations relating to casein and fat in milk and their relation to yield of cheese, thus increasing our knowledge of the subject considerably. The work of your own experiment station along this line can be found in the reports for the years of 1894, 1895 and 1896, and resulted in the conclusion that while payment on the basis of fat alone was not the ideal method, yet it was a considerable improvement on the method of pooling profits according to the weight of milk delivered, which was the common practice at that time. They also recommended, as a still better method, the addition of the factor two to the fat test, which sum would give fairly accurately the fat and casein available for cheese-making, thus recognizing at that date that the casein must be considered as well as the fat. No practical test for casein being then available, the factor 2 was made to do duty instead. Other stations have come to the same conclusion, and while recognizing that the fat basis is not the ideal one, have recommended it as the best available method up to the present time. Let me quote from a recent article of Prof. Dean's in *The Farming World*. He says: "We are safe in saying that all authorities are agreed that if the casein, as well as the fat in milk, could be determined accurately at a small cost, we should then have a more correct basis of comparison as to the relative values of milk for cheese-making than is got by test for fat only." At last we have a cheap, simple and accurate casein test, and if it should prove workable by the practical men in the country, it is possible that the solution of this long-discussed question is at hand.

In studying the subject of milk composition from the average of a large number of analyses, we are apt to overlook the fact that milk is a most variable product. Since the introduction of the Babcock test, we have all become more or less familiar with the variation in fat content of different milks at different times, but few of us realize the extent to which the casein and other constituents may also vary. We see casein placed at 2.5 per cent., get this figure in our head, and never give it another thought.

TABLE No. 2. COMPOSITION OF MILK OF NEW YORK HERDS.

——	Least.	Average.	Greatest.
Water	86.09	87.33	88.53
Fat	3.04	3.75	4.60
Casein	1.93	2.46	3.00
Albumen	0.47	0.68	0.87
Sugar and Ash	5.32	5.78	6.37

In Table No. 2 we have the results of a large number of analyses of the milk of New York herds, the samples being taken each morning from the milk of different patrons at a number of cheese factories throughout the state. In the centre column we have the average composition, while on either side we have the least and the greatest amount of each constituent which they found in normal milk. Thus we see that while the fat varies from 3 to 4.6 per cent. the casein also varies from 1.9 to 3 per cent. or a difference of 1.1 per cent.

The relation of casein to fat in these milks was found as low as 56 : 100, as high as 72 : 100, and with an average of 66 : 100.

TABLE No. 3. TESTS OF SINGLE HERD.

Herd.	Casein.	Fat.	Relation of Casein to Fat.	Cheese a 100 lbs. milk.
1	2.22	3.7	60: 100	9.62
2	2.53	3.7	68: 100	10.39
3	2.40	3.8	63: 100	10.18
4	2.56	3.8	67: 100	10.58
5	2.67	3.8	70: 100	10.85
6	2.41	4.0	60: 100	10.42
7	2.59	4.0	64: 100	10.97
8	2.72	4.0	68: 100	11.20
9	2.81	4.0	70: 100	11.42
10	2.68	4.2	63: 100	11.32
11	2.80	4.2	66: 100	11.62
12	2.95	4.2	70: 100	11.99

In Table No. 3, we have the fat and casein tests of milk delivered at the University creamery by twelve of our patrons, and, while the tests only cover the short period of one week, they will suffice to give you an idea of the variation which exists and its relation to cheese yield.

TABLE No. 4. TESTS OF SINGLE COWS.

Cow.	Casein.	Fat.	Relation of Casein to Fat.	Yield of cheese a lb. fat.
1	2.47	5.37	46: 100	2.25
2	2.77	6.01	46: 100	2.25
3	2.98	6.04	49: 100	2.33
4	3.31	5.95	55: 100	2.49
5	3.12	5.46	57: 100	2.52
6	3.11	4.83	64: 100	2.70
7	2.13	3.19	66: 100	2.76
8	2.47	3.47	71: 100	2.87
9	2.50	3.44	72: 100	2.91
10	2.61	3.57	73: 100	2.92

Table No. 4 gives the tests of ten cows in the University herd, showing still more markedly the variation which may occur among individual animals, giving us in this case extremes of 2.1 and 3.3 per cent. or a difference of 1.2 per cent.

With these facts in mind, it would seem quite reasonable to suppose that by selection and breeding, a strain of cows could be developed, whose milk would show a greater proportion of casein to fat than is at present the case, and so a greater cheese producing capacity a pound of fat.

Mr. Lund then proceeded to give a detailed description and demonstration of the new test, the essential features of which are as follows:* Two c.c. of chloroform and 20 c.c. of .25 per cent. acetic acid at 70 degrees F. are measured into the test bottle, and to this is added 5 c.c. of the milk to be tested at 70 degrees F. The bottle is then inverted and shaken for 15 seconds, after which it is whirled for 7½ to 8 minutes at a speed of 2,000 revolutions a minute in a centrifuge having a diameter of 15 inches. The casein is read off in percentage directly after the bottles have stood for 10 minutes.

A table comparing results obtained by the new method, with those obtained by the official methods, shows that when the test is properly operated, the results obtained are sufficiently accurate for all practical purposes.

ADDRESS.

By Geo. A. Putnam, Toronto.

We are here this evening with the dairymen of Western Ontario, standing in the fore-front, so far as the production of cheese is concerned, and so far as the quality is concerned, and we look upon the farmers and the dairymen surrounding the good town of Woodstock as among the leaders of Western Ontario. We would naturally expect that from the farmers of this locality, because of the exceptional natural advantages which you have. You have conditions which cannot be duplicated in any other part of the Province so far as territory is concerned. You have good land, good men, and good factories, and we naturally look to you to turn out a good quality of cheese. The Department has been more than gratified with the success attending the Dairy Association during the past year. Dairying education, so far as the instruction in the cheese factory and creamery is concerned, and so far as sanitary instruction is concerned, has been a success. Our main object in making the change of method last year, as you will all remember, was that we might introduce a method whereby every factory and every creamery would come under the direction of sanitary instruction and inspection. The result has been that about two hundred factories have received instruction this year that never heretofore took advantage of the work, and as we heard from Mr. Barr and Mr. Schell last night, it is thoroughness and uniformity of production that is going to count in the dairy industry. But how can we get uniform and high grade unless we are to have our factory instruction along these same lines? The Department has been more than gratified by this change in the instruction. It meant a good deal to the Department. It meant an expenditure of cash on the part of the Department of about $15,000. We did not collect anything from the factories, although in previous seasons they had given us $12,000. While the Department under the present administration, as in the past, is willing to give money for what is supposed to be good work, you must be prepared to show that this money is for legitimate purposes, and for a good object, before you can get the money. When the case was properly presented to them by your representatives, then the Department came to your assistance. This change in the system also causes the Department some anxiety, and so far as some of us were concerned, we would rather give the cash than endure the anxiety. We certainly approached this change with some hesitancy, in the method of giving authority to such large number of men to go to the factories, and go to the private producer, and say to them, "You must place your quarters in a better sanitary condition." We hope to do that, but as is usually the case, our greatest troubles are those which we never meet. I believe that the most of our troubles are those with which we never come face to face. This was the case with regard to the instruction work the past season. I have inquired from the chief instructor, and from Institute workers, and from men in connection with the Dominion Department of Agriculture, regarding the system which has been introduced during the past season, and they all have said that no criticism has been made. No unfavorable criticisms have reached their ears. This is most gratifying to the Department, and I am sure must be to your Association.

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*A complete description of the test will be found in Bulletin No. 156, of the Wisconsin Experiment Station, copies of which will be forwarded free to applicants.

We have learned another lesson from the past season's work. The producers throughout the country have learned one lesson which a few refused to learn until this season. They were fearful that the Department and the Association were going to introduce some system which would be burdensome to them. They said they would not submit to arbitrary measures. I think the system upon which the work has been carried on during the past season, has demonstrated clearly to the factory men that it is neither the wish of the Department nor of the Association to do anything which will be burdensome to any person.

We are all working for the one aim, the uplifting of the industry as a whole, including the producer, the maker, the salesman, and the buyer. We must all work in harmony or else the greatest results will not be attained.

There is undoubtedly a great wave sweeping over the whole continent for better sanitary conditions. We have heard at this convention, and at other conventions, that the key-note in connection with the dairy industry, is cleanliness. In our city there never was previously such an agitation for pure water supply, for better sewage disposal, and more cleanliness. We find it is the same in the towns and villages; they are beginning to awaken to the fact that they must keep their premises in a sanitary condition and practice those methods which shall eliminate, as far as possible, the injurious bacteria about which we have heard, and about which you will hear some more no doubt. The enforcement of legislation is another question. To get farmers to practice cleanly methods has been one problem which has faced the Department and the Association. Cleanliness in dairying is different from cleanliness in other lines of work. That has been fully explained to you. I might just say a word as to what we have done in the Department and what the Ontario Department is doing towards instructing the producers and farmers and others engaged in the industry. In the first place, we have our dairy instructions about which you have all heard so much; and then this year we have offered, at the Department's expense, to send to the annual meeting of every factory a speaker who will address the patrons in attendance at that annual meeting. In this way we are able to get at men who have not heretofore taken advantage of institute meetings and other means of education. We believe that the work is being done at this annual meeting which cannot be accomplished in any other way. In Eastern Ontario, during the latter part of November and December, we sent speakers to over two hundred annual meetings; and a great many were attended in Western Ontario, and we believe fully two-thirds of the factories, (which will mean about 800 factories), will receive instructions at their annual meetings. This is a splendid work. We might also make mention of the Farmers' Institute work. We are giving prominence to the Dairy Institute and the Farmers' Institute work. There are so many questions demanding the attention of this organization that we cannot give too much prominence to any one Department of the work. However, we are aiming to send to the dairy districts, at least one member of the deputation who will be able to give you instructions along some line of dairying. Then, of course, you know of our Dairying Schools; and we regret to note that this year both at Kingston Dairying School and at the Dairying School at Guelph, the attendance is not so large as formerly. What is the reason for this? We believe that we have in the ranks of the dairymen a lot of very bright men, but we regret that they are not taking advantage of the opportunity afforded for appreciating it, and learning more about their business at these Dairy Schools. Now, I wish to appeal to the farmers and the factory men who are here, that when they go back home they do something to spread this good news among the dairymen of their several localities. With one meeting a year you cannot hope to accomplish very much, although I think we will all admit that much good has been accomplished through the Institute, and other organizations. I trust you will endeavor to organize some sort of local club in your locality, in order that you may meet once a month, or oftener during the winter season, and discuss your own local conditions. Now we heard a good deal at the Eastern Convention on the unfavorable conditions which exist in the east. The Department cannot step in and wipe out part of these factories. The dairymen must come together, and must discuss their own local conditions, and solve their own problems. The Department always is ready to come to your assistance on any reasonable questions. But there are some things which the dairymen must do for themselves. We trust you will place yourselves in communication with the dairymen of the district, and work out your own salvation. We believe that through these monthly meetings, you have the means by which you can derive more good than you can from such gatherings as this.

I would leave that one message with you, and I hope you will take it home with you. One reason why I am so strong in recommending this, is that the Women's Institute has grown so rapidly during the last five years, and this is due largely to the fact, that they have depended upon their own resources, and have adhered to their own local conditions, and it is up to the dairymen of Western Ontario to make a little effort to help themselves.

ADDRESS.

By Col. James Munro, M.P., Embro.

While I never have been very closely identified with the Dairymen's Association, yet I have been interested in dairying. I have all my life been a consumer of some of the products of the cow, I even know what turnipy milk and butter is. I have been a patron of the cheese factory. I have been engaged, and am still engaged, in raising and feeding stock, so that I can fully appreciate the great good that is being done by these meetings, not only to the farmers in general but to all classes of the community.

These meetings give an opportunity for an interchange of views upon these subjects, and for the spread of information that tends to improve the methods of dairying, the treatment of the cow and her milk and the manufacturing of it into cheese and butter so that the best results may be produced.

For the last few years there has been a wonderful growth in the many industries of our country, but in none have there been such great developments as in that of dairying. I can well remember the industry in its infancy in this country, and the pioneers who were engaged in the work. I can remember Hiram Rennie, John Adams, Samuel Nelles, and a score of those who struggled along, and who were a great benefit to the several communities in which they worked; but somehow, regretful to say, it was not to their own pecuniary advantage, because they were forced to quit the business much poorer men than when they entered it. It is hard that such men should not meet with a different and better reward than they did. That was before the advent of the joint stock company factory, and before the advent of the dairy school, and before the factories had the advantage of instruction and inspection, and many of the present day facilities. Now, when these have been supplied, and after putting in proper plants and machinery, with proper sanitary conditions surrounding them, there can hardly be any excuses for turning out a poor article of cheese or butter, provided, of course, that good pure milk is supplied. My experience has taught me that it costs quite as much to keep a scrub, ill-shaped bullock as it does to winter the best pure-bred Shorthorn or good grade, that would readily bring them $60 to $70 for the export trade; and it will cost as much to keep a cow that would yield five quarts of milk as it would to keep one that would yield twice as much. It would be short-sighted policy on the part of the farmers to go to the trouble and expense of keeping 20 cows when 12 or 15 might produce the same results and profit. We cannot all expect the good results that Mr. Bollard obtained; but that is a good mark to aim at, and shows what can be accomplished by careful selection of cows from a family of good milking strain, and improving them. The same thing applies to beef producing animal. It does not pay to keep a poor animal of any kind.

Dairying is the bulwark of our Province to-day, and I do not think the farmers appreciate as much as they ought to the favorable condition they occupy as compared with other classes in the community, especially in times of financial stringency such as we have at the present time. Other factories are closing down, but cheese and butter factories go on forever, with slight interruption. I am pleased to be present to-night with you, and congratulate you on the great success attending your meeting here, and hope for a continuance of the advancement of the great interests in which you are engaged, and in which the whole Dominion is deeply interested.

CLEAN MILK—AN ILLUSTRATED TALK.

By E. H. Webster, Chief of Dairy Division, Washington, D.C.

The question under discussion is that of clean milk. It is a question that has a bearing on almost every phase of human life. We start in from a very early age to drink milk, and we keep at it until we enter the grave. Milk is an important household necessity; it is something that the housewife has to use in all her cooking operations. On the table it is in our tea and coffee, and we also use it for drinking purposes. We use the products of milk in butter and cheese and ice-cream, and numberless other articles, which are now on the market, are made from the products of the cow. Certainly the question of clean milk is one of vast importance to the consumer of dairy products, and it is one that is little understood by the producer and the consumer alike. It is little understood, because our viewpoint as to what clean milk is is different in so many cases. What is clean to one person is unclean to another, and so on; and therefore, it is very hard to determine from any abstract meaning of the word "clean," what it may mean to you or to me what it means to the housewife who does the cooking, or to the public who drink the milk. Therefore, I say, the word "clean" to us has an abstract meaning.

In discussing this matter of clean milk, there are three important facts to be considered. First of all, must be the health of the cow giving the milk; second, must be the health of the attendant who handles the milk from the time it is milked until it is consumed; and third, must be the cleanliness of the water and utensils that come in contact with the milk on its journey from the cow to the consumer. You have before you a picture of an animal. I can hardly call her a cow, and many of you would not recognize her as a cow. I have put this picture on simply to show the kind of animals that are sometimes used for the supply of milk. This animal is evidently suffering from tuberculosis, and several other things, and we have people in the United States that sell milk from this kind of a cow.

It is so important that milk congresses are being held all over the world to get rid of that kind of cow. I fully believe that we have proven that tuberculosis of the bovine race and the human race are one and the same. Now if that is the case, and the probabilities are that it is, what of the man who will sell milk from an infected herd of that kind? He is nothing less than a criminal. And yet statistics show us that around many cities we find as high as sixty and fifty per cent. of the animals producing milk to feed to the infants of these cities are affected with tuberculosis. If you will read modern scientific literature on this, and the readiness with which contamination will take place, you will see at once the great fight that must be had in eradicating tuberculosis from our herds all over the continent. Our own Government has gone so far as to stop inter-states shipment of cattle affected with tuberculosis, to stamp out this disease because it means much to the human race.

It is very certain that clean milk cannot be produced under defective conditions such as you see in the picture I now have before you. Here is a very convenient way some dairymen have of stacking manure, by just throwing it outside. You see the whole place is very untidy, and pails of water stand around. It is anything but a healthy place for animals, and much of the tuberculosis comes from animals living in such places as that; and yet there are plenty of barns like that, and I saw some of them coming along the train in Canada.

Those who were here last night will remember seeing that barn in Dutchland. It did not show any of the signs you see here—the ceiling covered with cobwebs; everything in such shape that it is impossible to produce clean milk. The barn and buildings of farmers are the index of the man.

Here we have the interior of a barn with smooth ceiling and smooth floors, the stalls are made of piping, and there is very little chance of contamination, and the man who works in a barn like that, must feel that he has got to keep clean himself.

We have one dairy near New York city where practically every cow has a bath before she is milked. They take a sponge and brush and wash the cow off. That is something that every farmer could not do, and it is not necessary. They can afford to do it on this particular farm, because they have a reputation that sells their milk at a high price. If everything is clean and kept clean you are bound to produce better milk. They use a small opening in the top of the pail, and most of the top is covered. It is a pail that is becoming quite common in many of our city dairies.

This picture shows a group of milkers of one of our dairies around New York City. You see they are dressed in white, everything about the place is kept clean and tidy. Wide-top open pails are specially devised to catch all the dirt that comes from the cow's flank, and keep it in the pail. When we talk about using different pails, people say we cannot do it; but it can be done.

Here is a pail with a hood on it, and any dirt that falls from the cow falls outside of the pail, instead of into it. Every seam in milk-pails should be flushed full with solder, so that a brush can get into every part of the pail in order to thoroughly clean it. Do not use a dish-cloth for washing a pail; use a brush.

We recently carried on a series of experiments. Our dairyman took a regular milker he had in the barn, and then took a student of bacteriology and put him in there with the regular man. He had studied bacteriology, and knew how to avoid getting dirt into the milk; and the milk fresh from his milking contained only 2,455 bacteria per c.c., and the regular ordinary farm hand as we find on our farms, with the same kind of pails and utensils, had 17,105 bacteria per c.c. The man who milks has got to have some brains of his own, and he has got to known just what to do in order to get clean milk. It is quite a common thing among dairymen that the cows do not give down their milk until you feed them; and the farmers will tell you you ought to milk first and feed next. You can train the cows just as you wish, and it makes quite a difference in the bacterial contents of the milk. In this case there are a little over 2,000 bacteria per c.c. where they are milked before feeding, and where they are milked after there 3,506, that comes from the dust in the air that is stirred up by feeding.

By wiping the cows off before milking them you help to produce clean milk. There was 7,000 bacteria per c.c. from cows with the unwiped udder, and where the udders were wiped there was only 716 bacteria, and that is quite a difference.

The open pail produced 3,439,200 bacteria per c.c., and the covered pail, under exactly the same conditions, only 103,600.

A good many of you people drink milk, and if you look in the bottom of the glass you will see the dirt around the bottom. Should that not be avoided?

In rinsing milk utensils with boiling water we simply cook the milk on the edge of the vessel. They should be first rinsed in warm water; then use the boiling water. There is no germ killer so good or so strong as the pure sunlight, and it is the cheapest. Water that you can bear your hands in does not destroy the germs in milk vessels.

This picture shows a milk sterilizing oven. The milk utensils are placed in the oven and the door is closed and high pressure steam is turned in there for ten or thirteen minutes, so that these utensils become thoroughly hot, and that destroys the germs. That is not possible on a farm. The best thing to do on a farm is to boil every milk utensil you have. If you can put the utensil in the water and keep it there till the water boils you have the best thing. Many people object to using boiling water because they cannot put their hands in. If you persist in using water that you can put your hands in you are not going to get clean vessels.

No milk plant can take bad milk and make it pure. You have got to get at the farmer who produced the milk. Every hour you add to the life of the milk it is growing poorer and poorer. We must shorten the time between its production and its use. Milk must be cooled thoroughly in order to keep it in right condition. Milk, as it was devised by nature, never was intended to see the light of day; milk is produced for the suckling of the young, and there is no interval between the drawing and its consumption. The whole question of the producing of milk when you have a clean healthy cow is what the man can do. It must necessarily cost more to produce milk in a clean condition than it does in a dirty way. One of our veterinaries made the statement that the farmers were only paid for taking care of the milk as they do to-day. I do not believe clean milk should be produced for the same price as the ordinary run of our milk is sold for. If the consumer can be assured that every bottle of milk bought is absolutely pure and free from disease I do not believe they are going to object to paying one or two cents more per quart.

We are not going to make butter and cheese out of milk that has been condemned and unfit for domestic purposes. We are going to insist on cleanly methods. It is going to cost the farmer more money, but it is going to add profits to the farmer. It is up to the farmers to see that their cows do better, and that they do better with their cows; and the cleaner the methods you pursue the better it will be, and the more profit the farmer will make. (Applause.)

FOOD VALUE OF MILK AND ITS PRODUCTS.

By Prof. R. Harcourt, O.A.C., Guelph.

If the true value of milk as a food were more fully appreciated, it would be used much more freely. Chemical analyses and experience prove that among our food materials there is none more wholesome than good pure milk. It is cheap, palatable, easily digested, and highly nutritious. Its value as an article of diet for children and invalids is fully recognized; but for adults in good health it is too frequently regarded as a luxury to be used as a condiment with tea, coffee, fruit, and as an adjunct in cooking. Milk is, however, not only a condiment and beverage, but a food, and a very valuable one.

On the other hand, the very qualities which make milk such a desirable food also render it undesirable from another standpoint. It is a particularly fine medium for the growth of bacteria; and, as a result of the manner of its production and the way it is commonly handled, it is subject to contamination with bad flavors, dirt, and all the myriads of germs usually associated with the dust that accumulates in the stable.

The consumer has a right to demand that milk furnished him shall be clean; that it will keep at least twenty-four hours after it is received, if kept at a temperature of 60° F. or below; that the flavor be not injured by improper feeding, careless methods of handling, or by the development of bacteria which cause bad flavors; that it contain no disease germs, or any form of preservative; and that the milk have a certain known composition which is uniform from day to day.

Milk contains all the ingredients required to nourish the body; that is, furnishes the materials which build up the body and keep it in repair, and also those which supply it with fuel to keep it warm, and to furnish the animal machine with the energy to do its work.

The best foods are those which perform these various functions in the most thorough and complete manner. We usually judge of the value of a food by several different standards. Thus, it must contain the constituents which are required by the body in proper amounts, it must be digestible and palatable, and it must be reasonably cheap.

Some foods contain all the ingredients required by the body: that is, protein, fat, carbohydrates, and mineral matters. The protein is used to form the tissues and fluids of the body, such as muscle, blood, bone, and brain; to repair their waste; and, if eaten in excess of the daily requirements, may be stored in the body as fat and drawn on as required for future consumption. Familiar examples of protein are lean meat, white of egg, casein of milk and cheese, and gluten of flour. The fats of foods, such as lard, fat of milk and butter, and the fat or oils of vegetable foods, are used as a source of energy, and if used in excess may form fat on the body. The starch, sugar, and cellulose are examples of carbohydrate bodies, and are generally speaking the cheapest source of heat and energy in the body. They may also be transformed into body fat. The mineral matter of a food is absolutely essential for the formation of bone and is also present in the tissues and fluids of the body.

The protein, fat, and carbohydrates may be oxidized or burned in the body, and the heat which they will produce is frequently used as a basis for comparison of the value of foods. Unfortunately this does not give us an entirely satisfactory basis for comparing the nutritive value of foods, for the protein is absolutely essential for the formation of flesh and yet has a low fuel value. It is equally true that it would not be just to make the comparison on the basis of the protein content alone, as the fat and carbohydrates are valuable nutrients. Taking all things into consideration, possibly a statement of the amount of energy a food is capable of producing is the best basis upon which to compare the nutritive value of foods, especially when they are arranged in a properly balanced dietary.

In order that we may have some measure for expressing the amount of heat that a given substance is capable of producing, the calorie is taken as the unit. Roughly speaking, a calorie is the amount of heat required to raise the temperature of one pound of water 4 degrees Fahrenheit. If one pound of starch or sugar is burned and all the heat utilized, it will furnish enough heat to raise 1,860 pounds of water 4 degrees in temperature. The fuel value of protein as it is ordinarily burned in the body is nearly the same as that of carbohydrates, but fat will give about 2.25 times as much heat as protein or carbohydrates, or 4,220 calories per pound.

It has been found that a man required a certain amount of protein, fat, and carbohydrates in his daily food, and that these ingredients combined should furnish approximately a certain number of calories of heat. The quantity of these several nutrients required will, if necessity, vary with the amount of energy exerted in the performance of work. Any food which will furnish all the nutrients in the right proportion to supply the needs of the body and in a digestible and palatable form, that is, not too bulky, and at a moderate cost, is a complete food. Unfortunately we have very few foods which will answer all these requirements, and if we had, it is quite probable that the monotony of the diet would soon render them so distasteful as to destroy their usefulness.

Milk is frequently spoken of as a complete food. It is to the infant, but for the adult it does not contain enough carbohydrates, and is too bulky. Wheat bread more nearly fulfills the requirements for a full grown person, but it is a little deficient in protein. Possibly oatmeal comes the nearest to being a complete food for the adult. It certainly has the advantage of being cheap.

But, as is well known, the food of man must please the palate as well as satisfy the demands of the body, and to secure this we resort to a very varied and mixed diet. It is not the intention to deal at this time with a great variety of foods, but to show which of our common foods furnish the most protein, fat, and carbohydrates for the least money, and to show where milk and its products stand as compared with some of the meat and vegetable foods.

For purposes of comparison the number of pounds of protein, fat, and carbohydrates, and the number of calories of heat which one dollar's worth of some of the more common foods will furnish has been calculated and are presented in the following table:

PROTEIN, FAT, CARBOHYDRATES, AND FUEL VALUE OF $1.00 WORTH OF EACH FOOD.

——	Price per lb.	Refuse, per cent.	Protein, pounds.	Fat, pounds.	Carbohydrates pounds.	Fuel value, pounds.
Milk	6c. quart	....	1.38	1.69	2.21	13,809
"	8c. "	....	1.04	1.27	1.66	10,402
Skimmed milk	10c. gallon	....	3.4	.30	5.1	17,070
Buttermilk	10c. "	....	3.0	.50	4.8	17,362
Butter	25c. pound	....	0.04	3.4	....	14,422
Cheese	17c. "	....	1.63	2.16	.24	12,593
Beef, fore quarter	6c. "	18.7	2.41	2.91	....	16,762
" hind quarter	8c. "	15.7	1.92	2.29	....	13,235
" flank	8c. "	10.2	2.12	2.37	....	13,944
" Sirloin	18c. "	12.8	.92	.90	....	5,509
Veal, cutlets	15c. "	3.4	1.34	.50	....	4,612
Mutton, chops	16c. "	16.0	.84	1.80	....	9,158
Lamb, hind quarter	18c. "	15.7	.92	.90	....	5,509
Ham, smoked	18c. "	13.6	.79	1.85	....	9,276
Ham, smoked and cooked	30c. "	....	.67	.75	....	4,405
Eggs	25c. dozen	11.2	.71	.56	....	3,853
White Bread	2½ lbs. 10c.	....	2.10	.5	12.2	28,710
Rolled Oats	7 " 25c.	....	3.5	1.9	20.0	51,730
Farinas	6 " 25c.	....	2.3	.24	18.7	40,070
Potatoes	90c. bag	20.0	2.18	.10	15.6	33,492

No attempt has been made to calculate the amount of digestible constituents, but it is probable that over 95 per cent. of the protein of the milk and meats, and about 80 per cent. of that of the cereals would be digested. The fat of the cereals would be less digestible than that of the milk and meats, and sugar of the milk would be almost entirely absorbed, while a considerable proportion of the carbohydrates of the bread and oatmeal would resist the action of the digestive juices. It is also quite probable that more energy would be required to digest the vegetable foods.

Taking the figures as they stand, it is evident that milk does not furnish protein and fat as cheaply as beef bought by the quarter, but it does supply more of these constituents than the various cuts of the meats. Skimmed milk and buttermilk are particularly cheap sources of protein, and are probably the cheapest source of this constituent among all our foods. Butter is valuable almost entirely for the fat it contains, and as an energy producer is as cheap as any of the meats. The food value of well-ripened cheese is too often overlooked. We have frequently found that nearly 50 per cent. of the protein of cheese is soluble in water when the cheese is ten or eleven months old. This would mean that it would be comparatively easily digested and in this respect it would be quite different to the green or unripened article. It should be further noticed that there is no refuse with the milk and its products.

It is not necessary to dwell more fully on the data presented in the table. It is evident that milk at 6 or 8 cents a quart is a cheaper source of the nutrients than meat as ordinarily retailed, and, if we allow for the refuse, nearly as cheap as when meat is bought by the quarter. Furthermore, it is certain that milk and its products used along with the cereals are a cheap source of the nutrients and energy, and that when the two are used together a sufficient supply of all the essential constitutents for growth and repair of the tissues of the body and for work can be obtained without the use of the more expensive meats.

PRESENTATION OF TROPHY AND MEDALS.

Mr. G. C. Creelman: I am not sorry that Mr. McLaren is not here tonight, because it gives me the opportunity of my life, for the first time, to present to a lady this beautiful trophy which has been offered for the best cheese in the show. It has been offered for a number of years. I find by the programme that for five years it has been offered under these conditions: "A Challenge Cup, valued at the sum of $150, to be the property of the exhibitor of cheese at the Winter Dairy Exhibition who shall receive the highest score three times, or in two successive years." This year it is my privilege as well as pleasure to present it to Miss Mary Morrison, of Perth County. I hope Miss Morrison, in taking this beautiful trophy to her own home, will keep it not only for this, but for the next and the succeeding year, and that it will become her property. I am sure it will become her property, not only with the consent, but with the greatest delight of the people of Western Ontario. (Applause).

Miss Morrison: I desire to thank the cheese buyers for this beautiful trophy. I never expected such an honor would be conferred upon me. I can assure you I prize it highly and will do my utmost to keep up the reputation I have won. I am sure it is more than I deserve. I thank you very kindly for the presentation. (Applause).

G. C. Creelman: The Silver Medal presented by Ryrie Brothers of Toronto, has been won by Mr. Thompson, of this county; and it gives me pleasure to present this beautiful medal at this time. (Applause).

Mr. Thompson: I feel very grateful for this presentation. I never expected to be the winner. I tried last year, and took second place. This year it has come to my lot to be the first place, and to receive this beautiful medal. I thank you very much. (Applause).

Mr. Creelman: The second prize is a Bronze Medal presented by the Ryrie Brothers, won by Wm. Pierce, of Oxford County. May we hope that his success will lead to greater things next year, and that Mr. Pierce will be able to win the first medal. I have much pleasure in presenting you with this bronze medal.

Mr. Pierce: I thank the Association, and like Mr. Thompson, I did not expect it. In fact, I did not know anything about it until the latter part of October, and I thought I had a pretty poor show. I am very thankful to get it, and will probably do better in the future. I thank the donators and members of the Association, and wish them every success. (Applause).

THE SHEPHERD OF THE SOIL.

By G. C. Creelman, O.A.C., Guelph.

"The shepherd of the soil is near to God,
Because he tends the Bounteous Mother Earth;
His feet are wont to touch the cooling sod;
He reads the face of nature from his birth.
The showers and the sun come in their place
To aid the work of this fond shepherd's hands.
The sweet content of life his vision brands
With peace, that gives his toil an added grace.
To him is given to see the Bounteous Hand
In all the gifts the earth so freely gives.
To him there comes a love for all the land;
And for God's children that from it must live.
Let us give reverence to this son of toil
For he is God's own shepherd of the soil."

I am pleased to-night to see so many people from the county of Oxford present. Their presence indicates their interest in the subject, and shows that agriculture is every year assuming a more important place in the eyes of town and city people, as well as people immediately interested in the business. The individual is the all important factor in agriculture, as in any other walk in life. What we want is:

(1) Not Better Cows but Better Feeders. The average cow in the Province of Ontario is said to give something less than 3,000 pounds of milk, and yet one cow in our College herd last year produced 20,778 pounds. I think I hear some one say that if they had the Government supply the feed and the feeder, they also could make more out of their cows; but I ask, "Is this true?"

James Leask, a very plain farmer in Eastern Ontario, bred, fed, and produced at his own expense a great Shorthorn steer in 1907. This steer he took to the great International Exposition at Chicago, and there won first place in his class, first place in his year. and first place over all competitors as Grand Champion in the Show. The Government had nothing to do with it; and yet this man, by superior judgment in selection, careful handling, and feed, was able to make for the Province of Ontario a very enviable reputation and to win some $1,400 in prizes.

We have a pretty good class of cows in Ontario, both east and west of Toronto, and where they are given a show they make pretty good returns. It is also true that no country in the world has a better reputation for the growing of good feed for cattle. With the cows and the feed, therefore, does it not surprise you that more of our men do not get larger returns from their dairy herds? Clearly it is the feeder that is at fault. and it is to him that I appeal for better methods and more system in his work.

(2) Not Bigger Farms But Better Farming. The difference between the average and possible crop is yet about 300 per cent. Some years if it is dry, many of our farms fall far below what they should do, if they were well farmed. The past season has shown many striking examples of this fact, viz., that the farmers who farmed well suffered very little from the drouth,

in comparison with those who farmed in a hap-hazard way. There are men in this country with seventy-five acres of land that are actually making more money in a year than others with farms of one hundred and fifty acres, with the soil originally of as good quality. Catch crops, crops to supplement the pasture, maximum production of forage so as to keep the maximum amount of stock, these are the things that go to build up a good farm and make it more valuable from year to year.

(3) Not More Breeds of Live Stock but Better Strains. Hardly a week passes but what we get inquiries as to what is the best breed of cattle, or horses, or sheep, or swine, or chickens, or ducks, for the farmer to raise. Each breed has its own good points, and some men would get only average returns from the very best bred animals, while others might take ordinary animals and by careful selection and good feeding soon raise up a herd as valuable and make more money each year. A better knowledge of the business is what is wanted; that is, a more exact knowledge. Sentiment plays no part whatever in the dairy business, except as a man gets to love his stock as he handles it; but a good natured beef cow that is quiet and easy going, and gives no trouble but eats a lot and produces but little has no place in the herd. We must know what every animal is doing and force each one to do its best. Then, if its best is not good enough, it must be sent to the butcher's block and a better one put in its place.

(4) Not Better Implements and Utensils, but a Better Knowledge of How to Use Them and How to Repair Them. It is hardly necessary for me to speak upon this subject, for you know just what I must say. Put the very best implements in the hands of a careless farmer and in one season they will be unfit for their best work. In the hands of another man, who exercises care, implements last a long time; but more than that, they are always in shape for their work, on short notice. Where every farm operation is done as far as possible at the time that it should be done, then you have the saving of good interest on your money; while on the other hand, where matters are delayed beyond the right time, then a large portion of the farmer's work, up to that time, goes for nothing.

(5 Not Bigger Barns and Stables, but Better Arranged and Better Ventilated Ones. Stables badly arranged, where the feed has to be brought a long way, and where labor saving machinery has not been introduced, makes the feeding and handling of cows very laborious indeed. Also, where stables are badly ventilated, there is not much chance to get pure milk, and the cows cannot thrive. If you have learned anything at this Convention about ventilation or remodelling of your buildings, then you ought to go home and put it into operation at once. Cut doors and windows where they will be handiest, and close up doors and windows where they are useless. Put in cement floors, and do the work yourself. Find out what is the best system now in vogue, by correspondence, and then be satisfied with nothing else. You will be surprised when you start a system of improvement how it will extend throughout your whole farm and how soon you will begin to reap the benfits, both in increased returns and the accomplishment of much more work in a given time.

In conclusion, let me say that if it be true: (1) That one-quarter of our cows are unprofitable; (2) That the average yield of our crops is but one-third of what it might be; (3) That our soils in many places are being worn out and are incapable of producing as large crops from year to year; (4) That we are using Patent Stock Foods at high prices that we might mix ourselves; (5) That in the using of broken seeds and small shrunken seeds our crops are reduced one-half; (6) That every stone pile and stump and wet place in the field reduces our acreage but not our labor; (7) That rich land too wet to plant early will pay for tile drainage in three years from the increased crop alone; I say, if all these things are true, then we should use every effort to make a change, that this country may improve from year to year, and that the high intelligence which characterizes the farming classes of this country may bear fruit one hundred fold.

George Smith, M.P., Woodstock, was the last speaker. He dwelt on the revolution of the past decade in farming processes. Necessity is the mother of invention, he said, and the implements were invented after bright minds saw what was needed. He contrasted in a very vivid manner the old fashioned methods with the new. He described the history of the threshing machine from the old clumsy flail to the fine steam thresher and its funnel for blowing straw to any place desired, in use at the present day. He also dwelt upon the revolution of the reaping machine. Wherever a man looks now-a-days he sees progress on every hand. Fences had improved, schools had improved, and the methods of fertilization of the soil had also advanced in proportion. He closed an excellent address by stating that while we see these evolutions and the wonderful improvements and methods of cultivating the soil taking place we must not forget the old pioneers who did so much for this country in the early days. We should be proud to trace our descent from these old pioneers who did so much to make the improvements of the present time possible.

RESOLUTIONS.

Mr. J. J. **Parsons** presented the following resolutions, all of which were adopted: "That, whereas, the success and educational value of this Convention, and the interest taken therein, is due in a marked degree to the presence of the speakers who have so kindly addressed our meetings, we desire to express our sincere thanks for their assistance and presence throughout the various sessions."

"That we, the members of this Association, desire to express our appreciation of the kindness of the Mayor, Board of Trade, and citizens of Woodstock in furnishing the use of the Opera House and Market Hall, together with the excellent musical part of the programme, free of charge for the Convention and Dairy Exhibition."

"That the thanks of the Convention be, and they are hereby tendered, to the Canadian Salt Company of Windsor, Ontario, through their general Manager, Mr. Henderson, for the very handsome medals and badges presented by the company to the members of this Association."

"That we, as Dairymen, feel that we are under great obligations to the Department of Agriculture for the assistance they have rendered the dairy industry through the system of instruction that has been given, and also in providing speakers to attend annual meetings of cheese factories and creameries free of all cost to the dairymen."

"That as an Association, we wish to express our great satisfaction with the work of the special officer appointed to take charge of the work regarding the adulteration of milk, and we recommend to the Board of Directors for 1908 the continuation of his services."

The Convention was then declared closed.

APPENDIX.

THE MILK, CHEESE AND BUTTER ACT.

(Assented to April 14, 1908.)

His Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:—

STANDARD OF MILK IN CREAMERIES.

Interpretation.

1. This Act may be cited as *The Milk, Cheese and Butter Act.*

Standard for milk for manufacture of butter in creameries.

2. All milk containing less than thirteen per cent. of total solids, of which three and three-quarters per cent. must be chemically dry butter-fat, shall be deemed below the standard required in creameries for butter manufacture. R.S.O. 1897, c. 251, s. 1.

Power to make rules.

3. The owners or board of management of any creamery in the Province of Ontario, may make such rules and regulations as may be advisable for the due carrying on of the business of the creamery. R.S.O. 1897, c. 251, s. 2.

Rules to be binding on patrons, etc.

4. The patrons of all creameries may be required to subscribe their names to such rules and regulations, and the rules and regulations shall be binding on the patrons, owners and board of management who have so subscribed. R.S.O. 1897, c. 251, s. 3.

PREVENTION OF FRAUDS.

Right to test milk.

Interfering with test.

5. It shall be lawful for the owner or manager of a cheese or butter manufactory to require the owner or custodian of any cow or cows whose milk is being bought for, or supplied or sent to, the manufactory, to submit such cow or cows at his farm or other premises where such cows are usually kept, to such milk test, by persons named by such owner or manager, as may be necessary for the said persons to ascertain the quantity and quality of the milk of such cow or cows, on any day, and at such time on any such day as may be appointed by said owner or manager, and in case the owner or custodian of the cows refuses to so submit them, or obstructs in the execution thereof the persons engaged in making the milk test, or interrupts the test, or interferes in any way with the test, or the application of its result, he shall, on complaint before any Justice or Justices of the Peace, forfeit and pay for every such offence a sum of not less than $10 nor more than $100, in the discretion of the Justice or Justices of the Peace who may hear such complaint, together with the costs of the prosecution, if so ordered, and in default of payment of the penalty and costs, shall be liable to be committed by the convicting Justice or Justices of the Peace, to the common gaol of the county, with hard labour for any period not exceeding six months or until said penalty and the costs of enforcing same are sooner paid. R.S.O. 1897, c. 251, s. 4.

Right to take samples of milk.

Interfering with taking of samples.

6. It shall be lawful for the owner or manager of any cheese or butter manufactory who suspects any person of selling, supplying, sending or bringing milk to the manufactory, of any offence under this Act, to enter upon or to appoint some person or persons to enter upon, and such appointed person may enter upon the premises of the suspected person, with or without notice, and take samples of milk from the cow or cows from which the supposed offender was or had been immediately before then procuring the milk or part of the milk so sold, supplied, sent or brought as aforesaid; and any such suspected person who obstructs or refuses to permit the taking of any such sample shall, on conviction thereof, be liable to a penalty of not less than $10 nor more than $50 with costs of the prosecution, and in default of payment thereof, shall be liable to be imprisoned in the common gaol of the county in which the offence has been committed for a period not exceeding three months with hard labour. R.S.O. 1897, c. 251, s. 5.

Notice to be given when milk diluted, etc.

7. No person shall sell or offer for sale in any city, town or incorporated village, and no person shall sell or supply under contract to any person in any city, town or incorporated village, and no person shall sell, supply, bring or send to a cheese or butter manufactory, or the owner or manager

thereof, milk diluted with water, or in any way adulterated, or milk from which any cream has been taken, or milk commonly known as "skimmed milk," or milk in which any preservative is contained, without distinctly notifying, in writing, the owner or manager of such cheese or butter manufactory, or the person or persons to whom it is sold in cities, towns, or incorporated villages, that the milk so sold, supplied or brought to be manufactured or otherwise disposed of, has been so diluted with water, or adulterated, or had the cream so taken from it, or become milk commonly known as "skimmed milk," or has had a preservative added to it, as the case may be. R.S.O. 1897, c. 251, s. 6, *amended.*

Notice to be given when any part of milk is kept back.

8. No person who, in the course of his business agrees to sell, supply, bring or send to any cheese or butter manufactory, or the owner or manager thereof, to be manufactured, the milk of any cow or cows, shall in the course of such dealing and business, keep back any part of the milk of such cow or cows without distinctly notifying, in writing, the owner or manager of such cheese or butter manufactory what portion of the milk he has so kept back. R.S.O. 1897, c. 251, s. 7.

9. Notwithstanding anything contained in this Act, no person shall be subject to any penalties under this Act for selling in any city, town or incorporated village milk from which any of the butter, fat or cream has been removed, provided the milk so sold or offered for sale is advertised as "skimmed milk" and the person to whom the milk is sold is informed that the same is "skimmed milk." (*New.*)

Notice to be given when milk tainted.

10. No person shall sell, supply, bring or send to a cheese or butter manufactory, or owner or manager thereof, to be manufactured, any milk that is tainted or partly sour without distinctly notifying, in writing, the owner or manager of such cheese or butter manufactory of such milk being tainted or partly sour. R.S.O. 1897, c. 251, s. 8.

11. No person supplying milk or cream to a cheese factory or creamery, or for sale in cities, towns or incorporated villages, shall keep his dairy, milk house, milk stand, or any vessels or equipment used for the storing or the carrying of milk or cream, in an unclean or unsanitary condition. 6 Edw. VII. c. 48, s. 1, *amended.*

Cheese factories to be kept clean.

12.—(1) Every cheese factory and creamery manufacturing butter or cheese for public use or sale, and the premises upon which milk or cream is offered for sale and the surroundings of every such cheese factory and creamery and premises shall be kept in a clean and sanitary condition, and all the water used therein for the manufacture of any dairy products must be clean and pure.

Penalty.

(2) The owner or manager of any cheese factory or creamery or premises upon which milk or cream is offered for sale refusing or neglecting to observe the provisions of this section after being warned or advised by a dairy inspector, shall, upon conviction thereof before any Justice or Justices of the Peace, forfeit and pay a sum of not less than $50 nor more than $200, together with the costs of prosecution, and in default of payment of such penalty and costs shall be liable to be committed to the common gaol of the county with hard labor for a period not exceeding six months. 6 Edw. VII., c. 48, ss. 2 and 3, *amended.*

Appointment of inspectors.

13. Upon the recommendation of the Minister of Agriculture, the Lieutenant-Governor in Council may appoint one or more persons as inspectors for the enforcing of the provisions of this Act, who shall be known as Dairy Inspectors. The Lieutenant-Governor in Council may determine the remuneration to be paid to such inspectors. 6 Edw. VII., c. 48, s. 4.

14. All dairy inspectors appointed under this Act shall have free access and admission to all cheese factories and creameries and the premises upon which milk or cream is offered for sale located within the Province and to all the lands adjoining the same, and to the premises of all persons supplying milk or cream to any cheese factory or creamery, or for sale in cities, towns or incorporated villages; they shall also be empowered to take and test samples of milk found in cheese factories or creameries or in the possession of milk dealers having the same for sale in cities, towns or incorporated villages, or in transit between producers and cheese factories and creameries, between producers and dealers or between dealers and consumers in cities, towns or incorporated villages; and they shall have the right to take and test samples of milk found upon the premises of producers supplying milk to cheese factories or creameries or for sale in cities, towns or

incorporated villages, and may take and test samples from cows which have been producing milk to be sold to cheese factories or creameries or to be delivered for sale in cities, towns or incorporated villages, and any person refusing admission to the same or offering obstruction to the work of inspection or the taking of samples or testing of same shall be subject to the penalties provided in section 15. 6 Edw. VII., c. 48, s. 5, *amended.*

Report of inspector.

15. Every inspector appointed under this Act shall make such reports and in such form as the Minister may direct. 6 Edw. VII., c. 48, s. 6.

Penalty for violations of ss. 7, 8, 10, 14.

16.—(1) Any person who, by himself, or by his servant or agent, violates any of the provisions of sections 7, 8, 10 or 14 of this Act, upon conviction thereof before any Justice or Justices of the Peace, shall forfeit and pay a sum of not less than $5 nor more than $50, together with the costs of prosecution, in the discretion of the Justice or Justices, and in default of payment of such penalty and costs, shall be liable to be committed to the common gaol of the county, with hard labor, for any period not exceeding six months, unless the said penalty and the costs of enforcing same are sooner paid.

Evidence for violations of ss. 7-8.

(2) For the purpose of establishing the guilt of any person under the said sections, 7 or 8 of this Act, it shall be sufficient *prima facie* evidence to show that such person, by himself, his servant, or agent, sold, supplied, sent or brought, to be manufactured, to any cheese or butter manufactory, milk substantially below the standard of that actually drawn, or by the accused represented as having been drawn from the same cow or cows within the then previous or subsequent two weeks, provided the comparison or test is made by means of a lactometer and Babcock Tester, or by some other adequate means of making the comparison.

Secs. 7, 8 and 10 not to apply where defendant shows want of knowledge.

(3) The said sections 7, 8 and 10, shall not apply where the person charged with the offence proves to the satisfaction of the Justice or Justices of the Peace that the alleged offence was committed by some person or persons other than a member of the family of the person charged with the offence or was committed by some person or persons other than his servant or agent, and also that the offence was committed without his knowledge and consent. (*New.*)

Description of offence in information or complaint.

(4) In any complaint made or laid under said sections, 7, 8, 10 or 14 of this Act, and in any conviction thereon, the milk complained of may be described as deteriorated milk, without specification of the cause or mode of deterioration, and such description shall be a sufficient description of the offence to sustain a conviction, and in any complaint, information or conviction under this Act the matter complained of may be declared, and shall be held to have arisen within the meaning of *The Ontario Summary Convictions Act,* at the place where the milk complained of was to be manufactured, notwithstanding that the deterioration thereof was effected elsewhere. R.S.O. 1897, c. 251, s. 9, *amended.*

Appropriation of penalties.

17. Any pecuniary penalty imposed by the preceding section in respect of selling, supplying or bringing milk to a cheese or butter manufactory, shall, when recovered, be payable one-half to the informant, and the other one-half to the owner, treasurer or president of the manufactory to which the milk was sent, sold or supplied for any of the purposes aforesaid in violation of any of the provisions of this Act, to be distributed among the patrons thereof in proportion to their respective interests in and profits thereof. R.S.O., 1897, c. 251, s. 10.

Fraudulent use of cream of milk supplied.

Penalty.

18.—(1) Any butter or cheese manufacturer who knowingly and fraudulently uses, or directs any of his employees to use for his or their individual benefit, any cream from the milk brought to any cheese or butter manufactory, without the consent of all the owners thereof, shall, for every offence, forfeit and pay a sum not less than $1 nor more than $50, in the discretion of the Justices before whom the case is heard.

Conviction and levy of penalty.

(2) Any two or more Justices of the Peace, having jurisdiction within the locality where the offence has been committed, may hear and determine such complaint upon the oath of one or more credible witnesses, and shall have power, in case the penalty and costs awarded by them are not forthwith paid upon conviction, to levy the same by distress and sale of the goods and chattels of the offender, by warrant under their hands and seals or the hands and seals of any two of them, and the penalty, when recovered, shall be paid over by such Justices, one-half to the person complaining, and one-half to the treasurer of the municipality, district or place where the offence

In default of distress imprisonment.

has been committed; and in default of payment or sufficient distress, the offender may, by warrant signed and sealed as aforesaid, be imprisoned in the common gaol for a period not less than one day nor more than twenty-five days, at the discretion of such Justices, or any two of them, unless such penalty, costs and the charges of commitment are sooner paid.

Civil remedy.

(3) Any party aggrieved by such fraudulent conduct as aforesaid may at his election sue the offender in any Civil Court of competent jurisdiction, and recover from him the amount of damages sustained, and levy the same with the costs according to the ordinary practice of the Court in which such action is brought. R.S.O., 1897, c. 251, s. 11.

Proviso as to Justices interested.

19. No Justice or Justices having any pecuniary interest in a cheese or butter manufactory as aforesaid, shall hear or determine any complaint under this Act. R.S.O., 1897, c. 251, s. 12.

Rev. Stat., c. 251 repealed.

20. Chapter 251 of the Revised Statutes of Ontario, 1897, and amendments thereto are repealed.

DAIRY SCHOOLS OF ONTARIO.

GUELPH DAIRY SCHOOL.

Notes on Dairy School, 1908.

The Staff in connection with the Dairy School at the Ontario Agricultural College, 1908, consisted of the following:

Prof. H. H. Dean, B.S.A.	Dairy Husbandry.
R. W. Stratton	Instructor in Separators.
Fred Dean	Instructor in Buttermaking.
Alex. McKay	Instructor in Cheesemaking.
C. H. Ralph	Assistant Instructor in Cheesemaking.
Geo. Taylor	Instructor in Milk-Testing.
Geo. Travis	Instructor of Boilers, Engines, etc.
Miss Laura Rose	Instructress in Farm Dairy.
Prof. S. F. Edwards, M.Sc.	Bacteriologist.
J. Fulmer	Instructor in Dairy Chemistry.

The attendance during the regular course was 52, and during the special courses for milk-testing and instructors, 25, making a total of 77. There was a large demand during the term and at the close for all students who had done good work during the term. There was no difficulty in obtaining positions at from $50 to $65 per month.

More time this year was devoted to the subjects of chemistry and bacteriology, and the practical laboratory courses in these two subjects were very satisfactory to the class. Dairymen are beginning to realize, more and more, that these two sciences are at the basis of successful dairying, and must receive more attention from dairy students than they have ever had before. Special instruction was also given during the month of March on handling steam boilers, engines, piping, soldering, etc. This is practical instruction which is very helpful to men in factories.

The examinations at the end of the term were spread over the last three weeks of March instead of coming the last three days as has been the custom in the past. The results were more satisfactory.

In 1909, the course will be similar to that given in 1908, but we expect to add one month's instruction in "soft" cheesemaking. This is an important branch of dairy work, and if these cheese are properly made, there is no difficulty in securing a good market at profitable prices.

On the whole, the term for 1908 was one of the best which has been held for some years. Instructors and students took a very active interest in the work, and all agreed that it was three months profitably spent.

KINGSTON DAIRY SCHOOL

Session of 1907-8.

In making this report for insertion in the Annual Report of the Dairymen's Association, much of what they have to say must, of necessity, be curtailed. A fuller report is being prepared for the Department and will likely appear in bulletin form.

STAFF.

J. W. Mitchell, B.A.	Superintendent.
J. W. Mitchell	Dairy Lectures.
G. G. Publow	Instructor in Cheesemaking.
J. H. Echlin	Assistant in Cheesemaking.
Jas. Stonehouse	Instructor in Buttermaking and Separators.
J. Buro	Assistant in Separators.
W. W. Dool	Assistant in Buttermaking.
J. F. Singleton	Instructor in Milk Testing.
W. T. Connell, M.D.	Bacteriology.
W. L. Goodwin, D.Sc.	Dairy Chemistry.

We shall divide the report into two parts:

1. School work proper, or teaching and instruction work.
2. Experimental and investigation work.

SCHOOL WORK.

In the early years of the school the work of the session was divided into a number of short courses—and quite properly so. Feeling, however, that the time was at hand when every cheese and butter maker should have a thorough dairy school training, we began dropping out these short courses in order to lengthen the long course and during the session just closed there were just two courses given. viz., the Long Course, practically three months in length, and, following this the Instructors' Course for Syndicate Instructors. This enabled us to offer a thorough course to those who wished to remain throughout the Long Course and take the final examinations at its close. In our calendar we distinctly announced, however, that anyone who wished to take a short course in the school would be privileged to do so at any time during January and February, or the first two months of the Long Course. Thus short courses were really provided for while provision was made for materially lengthening the long course. We found this plan to work admirably.

In many respects the session just closed has been a most satisfactory one. Sixty-one students registered during the Long Course and remained a longer or shorter time, and twenty-three students took our Instructor's Course, making a total registration, in all, of 84 students. A goodly number of the Long Course students remained to the end and took the final examinations.

Never in the history of the school have we received a more satisfactory supply of milk and cream, although we were compelled, owing to the great scarcity and abnormally high price of goods, to pay an exceptionally high price for our milk supply.

The school opened as a creamery on November 12th and continued as such to the end of December, ran as a school during the months of January, February and March, and was again operated as a creamery up to the tenth of April.

In the work of the Long Course were comprised the following subjects: Dairy science (including the farm side of dairying), cheesemaking, buttermaking, separators, milk-testing, dairy bacteriology, dairy chemistry (lectures and laboratory work), boilers and engines, and soldering and pipe-fitting. The students were required to stand the test of both practical and written examinations, which covered all the subjects indicated.

Experimental and Investigation Work.

New Cream Bottle for Babock Test: During the past year we brought out a modified form of cream test bottle. The trouble with the old style of cream bottle, which is graduated for reading for 18 grams, is, that by the time 18 grams of cream are taken and a little water and the necessary amount of sulphuric acid added, the bowl of the bottle is so full that there is no room for shaking the bottle and properly mixing the contents; and, furthermore, a sufficient quantity of water cannot be added to insure against charred readings. The new style of bottle devised by us, while it has the same size of bowl as the old, has a smaller neck, graduated to read per cent. of fat for 9 instead of 18 grams. Its advantages are obvious. One can take 9 grams of cream and add 9 c.c of water and the usual amount of acid and still leave plenty of room for readily mixing the contents, while the large amount of water added prevents the sample from charring—two decided advantages.

Moisture Test: For a long time practical dairymen have felt the necessity for a practical moisture test. Mr. W. O. Walker, of the School of Mining and lecturer of dairy chemistry in our school, and the writer made a thorough and exhaustive investigation of this subject and examined the different tests in use, and decided that each lacked, in one respect or another, the essentials of a practical moisture test for curd, cheese and butter. A test, to be practical, must be reasonably accurate, rapid, simple and inexpensive to operate, easy to clean, durable, easily and cheaply kept in repair and moderate in price. They undertook to devise such a test and feel that they have succeeded in doing so. As a full description and cut of it will appear in bulletin form, it will suffice, at present, to say that it is reliable and speedy, easy to conduct, can be operated at a small cost and is equally satisfactory for determining the moisture in curd, cheese and butter, while the apparatus is practically all metal and hence very durable.

The Making of Butter from Whey: During the session just closed we made a study of the making of butter from whey, and although we are not prepared to speak finally upon the subject, we feel that we gleaned some information which will prove of interest.

On different occasions we ran our separators with a view to determining *the fuel cost of elevating and separating the whey.* Water was used for this purpose as it has practically the same consistency as whey. Each test extended over a period of three hours. We ran the engine to pump the water for the separators and used steam turbines separators. The amount of water in the boiler, the steam pressure and the fire were left practically the same as at the close as at the beginning of the test. Soft coal slack at $4.00 per ton used for fuel. The cost of elevating the water and running the separators was about 2¼cts. per 1,000 lbs. Taking 3 lbs. of butter as an average yield per 1,000 lbs. of whey the cost per pound of butter for this portion of the work would be ¾ c. We are strongly of the opinion that were an ejector used, instead of a pump, for elevating the whey the cost would exceed this somewhat.

During the session we conducted a number of experiments in the *making of butter from whey.* While it is usually of good quality when first made, it did not prove to be possessed of good keeping qualities. It readily deteriorated in flavor. Of course the milk, and frequently the whey, was old and this may have had much to do with the keeping quality of the butter. However, it suggests the necessity for a thorough investigation of the whole subject, and this we purpose doing during the season of 1908, under regular factory conditions. It would be wisdom on the part of factorymen to await these results.

Another thing we learned during our experiments was, that by increasing the speed of the separator slightly you can separate, and separate efficiently, fully 60 per cent. more of whey than the machine is rated to separate of milk; that is, a machine with a rated capacity of 3,000 lbs., will readily separate 5,000 lbs. of whey. Of course, this call for a cover with a larger inlet tube.

Making Cheese from Rich and Poor Milk: During the session just closed we were afforded a splendid opportunity of investigating this point, as we were able to obtain milks varying in fat content from 3 to 4 per cent. On several occasions we put like quantities of the different grades of milk into different vats and made them up separately. When the cheese were made the yields differed so much that when they were placed side by side they resembled a flight of stairs. Let me give an example, which could be multiplied many times if space afforded:

Lbs. Milk	Per cent. Fat.	Lbs. Cheese.	Fat in Whey (%)
325	3.0	27.0	.2
325	3.4	29.5	.2
325	3.8	35.5	.2

Furthermore, there was a marked difference in quality, the cheese from the richer milk being quite superior to that from the poorer. The lesson is obvious. We should certainly pay in cheese factories according to quality and not by the pooling system.

This work was conducted by our instructor in cheesemaking, Mr. G. G. Publow, and needless to say, was carefully and skilfully done.

A Common and Unsuspected Cause of Cream Testing Low in the Fall when the Milk is Rich: While it is well known that changing the cream screw or the speed or feed, or a difference in the richness of the milk, will alter the richness of the cream, these do not furnish a reason for the cream supplied to our cream-gathering creameries so commonly testing lower during the fall of the year than during the summer, despite the fact that the milk has increased in richness.

Under the direction of our instructor in buttermaking, Mr. Stonehouse, we made an investigation of this subject, with the result that we fully satisfied ourselves that this apparent anomaly is really due to the partial cooling of the milk, during the cool weather of this season of the year, before it is put through the hand separator. The following data will serve to illustrate this point:

Machine.	Temp. of Milk.	Test of Cream.	Test of Sk. Milk.
A	80	27	.10
	95	31	.10
B	80	25	.08
	95	28	.06
C	85	40	.025
	95	43	.025

In all cases we took the same milk and divided it, separating one portion at the lower and one at the higher temperature, as indicated.

The explanation of the foregoing no doubt lies in the fact that as the milk cools it becomes more viscous or syrupy in its consistency and as a result does not flow out the skim-milk tubes so readily, thus causing a larger percentage to be taken as cream.

Annual Report

OF

The Agricultural Societies of Ontario

For the Year

1907

(*PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE*)

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THE LEGISLATIVE ASSEMBLY OF ONTARIO

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1907

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TORONTO.

To the Honourable WILLIAM MORTIMER CLARK, K.C.,
Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the pleasure to present herewith for the consideration of your Honour the Report of The Agricultural Societies of Ontario for the year 1907.

Respectfully yours,

NELSON MONTEITH,
Minister of Agriculture.

TORONTO, 1907.

Annual Report of the

Agricultural Societies of Ontario

For the year 1907.

To the Honorable Nelson Monteith, *Minister of Agriculture*:

Sir,—I have the honor to present herewith the report of the Agricultural Societies of Ontario for the year 1907, which contains the proceedings of the Seventh Annual Convention of the Ontario Association of Fairs and Exhibitions, and a statement of the amount of Legislative grants to these societies for 1906 and 1907.

During the period covered by this report my predecessor, Mr. Cowan, was in charge.

It is my intention in the next report to have a detailed statement of the work done by the different societies throughout the Province.

I have the honor to be, Sir,

Your obedient servant,

J. LOCKIE WILSON,
Superintendent of Agricultural Societies for Ontario.

Ontario Association of Fairs and Exhibitions

OFFICERS FOR 1907.

President,	Wm. Laidlaw, Guelph.
1st Vice-President,	A. McDonald, Shelburne.
2nd Vice-President,	H. A. Gould, Uxbridge.
Sec.-Treas.,	Alex. McFarlane, Otterville.
Cor.-Sec.,	J. Lockie Wilson, Toronto.
Auditors	Joseph Hudspeth, Caledonia. Wm. Collins, Peterboro.

Executive Committee

J. W. Sheppard, Cayuga ; J. Thos. Murphy, Simcoe ; David Evans, Strathroy ;
O. J. Wilcox, South Woodslee ; George E. Lee, Highgate ; George Downey, Bolton ;
Edward Gough, Powassan.

DELEGATES IN ATTENDANCE, 1907.

Name.	P. O. Address.	Society.
Anderson, W., V.S	Fergus	C. Wellington.
Allan, A. F	Comber	Tilbury, W. and N.
Alexander, Wm	Doe Lake	E Parry Sound.
Alexander, M	“ “	E. Parry Sound.
Affleck, R. R	Middleville	Lanark.
Allan, Crawford	Glencoe	Middlesex.
Allen, Fred. T	Hampton	W. Durham.
Boughner, Elias	Simcoe	Norfolk.
Briceland, E	Wolfe Island	Wolfe Island.
Birdsall, F	Birdsall	E. Peterboro.
Bolton, John	Wildwood	S. Perth.
Burt, James	W. Flamboro	N. Wentworth.
Braden, A	Bobcaygeon	Verulam.
Berdan, A. A	Glencoe	Ekfrid.
Bowman, Joseph	Craigvale	Simcoe.
Broderick, John	Mitchell	Fullarton, Logan & Hibbert.
Benning, W. E	Listowel	Listowel.
Brett, R. R	Essex	Essex.
Banting, J. D	Cookstown	Cookstown.
Bricker, Amos	Berlin	N. Waterloo.
Boyse, H. J	Ingersoll	N. and W. Oxford.
Black, W. D	Parham	Hinchinbrooke.
Baker, T	Solina	W. Durham.
Black, M. M	S. Dorchester	Dorchester.
Brown, Cyrus	Meadowvale	Toronto Township.
Clapp, J. A	Picton	Prince Edward.
Cooney, J	Brampton	Peel.
Chinnick, Jas. E	Chatham	W. Kent.
Cole, D. M	Wildwood	S. Perth.
Clough, John	Binbrook	Binbrook.
Carruthers, A	Whitby	S. Ontario.
Cowan, M. A	Craigvale	Simcoe.
Cowan, John	Craigvale	Simcoe.
Connell, James	Harriston	Minto.
Collins, Wm	Tara	Arran.
Cohoe, A. W	S. Woodslee	Maidstone and Rochester.
Coatsworth, G. W	Kingsville	Essex.
Collyer, Wm	Ingersoll	South Oxford.
Clark, W. J	Goderich	Goderich.
Campbell Hugh	Arthur	Arthur.
Cape, John	Hamilton	Hamilton Horticultural.
Collins, William	Peterboro	Peterboro Ind.
Clark, H. G	Georgetown	Esquesing.
Duncan, R. F	Ancaster	Wentworth.
Devitt, C. G	Rockland	Euphrasia.
Dewar, R. H	Fruitland	Saltfleet.
Drew, Henry	Longlake	Hinchinbrooke.
Dromgold, John	Wallacetown	W. Elgin.
Downey, George	Bolton	Bolton and Albion
Dewhurst, J. J.	Essex	Essex.
Dempsey, D	Stratford	Stratford.
Dunsmore, A	Stratford	Stratford.
Dynes, S	Burlington	Nelson and Burlington
Donaldson, W. T	Millbrook	Millbrook.
Dolson, A	Norval	Peel.
Donaldson, D. J	Strathroy	Middlesex.
Elgie, Peter	Oliver	Thorndale.
Else, L. J	Boxall	Shedden.
Ewing, A. R	Waterford	Townsend.
Evans, David	Strathroy	W. Middlesex.

NAME.	P. O. ADDRESS.	SOCIETY.
Elliott, J. E	Woodbridge	Woodbridge.
Ellis, J	Lindsay	Victoria.
Foley, John	Howe Island	Howe Island.
Fallis, James	Palmerston	N. Wellington.
Fox, George M	Drayton	Peel and Drayton.
Flath, Lewis	Drayton	Peel and Drayton.
Farquharson, J	Teeswater	Culross.
Field, J. G	Tavistock	Tavistock.
Fawcett, W	Wolfe Island	Wolfe Island.
Ferris, J. B	Campbellford	Seymour.
Fry, W. A	Dunnville	Dunnville.
Feasby, T	Uxbridge	Uxbridge.
Goodfellow, W. J	Lefroy	Innisfil.
Gainer, W. H	Welland	Welland.
Glendenning, John	Valentine	Brock.
Gough, E	Powassan	N. Parry Sound.
Griner, J. A	Brockville	Brockville.
Goltz, A. J	Bracebridge	S. Muskoka.
Garbutt, R. J	Belleville	Belleville.
Goring, A. H	Tavistock	Tavistock.
Graham, R	Saurin	Elmvale.
Gould, H. J	Uxbridge	Uxbridge.
Graham, A. C	Victoria Road	N. Victoria.
Gregg, Samuel	Ingersoll	S. Oxford.
Gray, Edwin	Norwich	N. Norwich.
Gould, J. B	Markham	E. York and Markham.
Henderson, J. K	Brookfield	Welland.
Houston, John	Chatham	W. Kent.
Hershey, H. M	Stone Quarry	Bertie.
Hammill, W. H	Beeton	Beeton.
Hickson, William	Bobcaygeon	Verulam.
Hutt, Simon	Berwick	Finch.
Hunt, C. F	St. Thomas	Elgin.
Hoar, H. C	Bowmanville	W. Durham.
Homuth, F	Wingham	Huron.
Hewer, James	Guelph	Wellington.
Hoskin, Thomas	Cobourg	Cobourg Central.
Henderson, G. G	Sarnia	W. Lambton.
Hudspeth, J	Caledonia	Caledonia.
Hamilton, R. A	Godfrey	Hinchinbrooke.
Hanmer, D. G	Burford	Burford.
James, David A	Dorchester Station	North Dorchester.
Jewell, W. E	Bowmanville	West Durham.
Jones, W. J	Parry Sound	Parry Sound.
Jackson, Charter	Otterville	South Norwich.
Jarvis, Oliver	Simçoe	Norfolk.
Johnston, J. E	Chapman	Tweed.
Johnson, J	Orangeville	Dufferin.
Kennedy, D. B	Bolton	Bolton and Albion.
Kavanagh, M	South Mountain	Mountain.
Kitchen, S. C	Bloomsburg	Norfolk.
Kewley, H. D	Sarnia	West Lambton.
Kneeshaw, J	Hamilton	Hamilton Horticultural.
Kaiser, Dr	Oshawa	Oshawa.
Knowles, J. M	Dundas	North Wentworth.
Lithgow, R	Thedford	Bosanquet.
Lanigan, R	Stirling	Centre Hastings.
Lethridge, Jno. G	Glencoe	Middlesex.
Lee, George E	Highgate	Orford.
Laidlaw, Wm	Guelph	Guelph.
Livingstone, W. W	Tillsonburg	Dereham.
Limebeer, W. J	Caledon	Caledon.
Lick, E	Oshawa	Oshawa.
Mitchell, J. G	Clarksburg	Collingwood.
Martin, Wm. H	Craigvale	Simcoe.
Mitchell, John	North Glencoe	Middlesex.
Millar, A	Arden	Brooke.
Ming, E	Napanee	Lennox.
Moore, George	Berlin	North Waterloo.

NAME.	P. O. ADDRESS.	SOCIETY.
Murphy, J. Thos	Simcoe	Norfolk.
Mason, R. W	Jarvis	Walpole.
Miskokomore, C. E.	Muncey	Chippawa.
Mannchan, W. J	Brockville	Brockville
Miller, J. W	Streetsville	Toronto Township.
Miles, W. F	Burford	South Brant.
McDiarmid, Jno	Lucknow	Lucknow.
McIntyre, W	Beaverton	Thorah.
MacColl, Arch	Aldboro	Aldboro.
McKee, T. H	Stirling.	Centre Hastings.
McDonald, A	Shelburne	Dufferin.
McCullough, Alex	Lefroy	Innisfil.
McEwing, James	Drayton	Drayton.
McDougall, N	Tara	Arran.
McKellar, Edwin	Wallacetown	West Elgin.
McKinnon, N	Priceville	Artemesia.
McMillan, D	Priceville	Artemesia.
McFarlane, Alex	Otterville	South Oxford.
McGill, P	Erin	Erin.
McClure, Wm	Elder's Mills	Woodbridge.
McClure, S	Elder's Mills	Woodbridge.
McClung, Thos	Cayuga	Haldimand.
McGlynn, James	Wolfe Island	Wolfe Island.
McDonald, John	Ardoch	Hinchinbrooke.
McCowan, A	Ellesmere	Scarboro.
McLeod, P	Hawkstone	Oro.
McGuire, Wm	Waterford	Townsend.
McIntyre, W	Grand Valley	East Luther.
McTavish, D	Flesherton	Centre Grey.
Nixon, G	Dundalk	Proton.
Naylor, Isaac	Islay	Fenelon Falls.
O'Reilly, C	Norwood	East Peterboro.
Oliver, R. S	Branchton	South Waterloo.
O'Neail, H. C	Paris	Paris.
Orr, J. D	Norval	Peel.
Purdy, John	Wolfe Island	Wolfe Island.
Purdon, H. P	Powassan	North Parry Sound.
Peake, Charles	Bracebridge	South Muskoka.
Price, D. H	Aylmer	East Elgin.
Plant, Edwin	South Woodslee	Essex.
Parker, B. W	Ancaster	Ancaster.
Paget, John	Sundridge	Strong.
Pearson, H	Weston	West York.
Park, James	Caledonia	Caledonia.
Park, William	Grand Valley	East Luther.
Randall, J. DeW.	Niagara	Niagara.
Reid, J. C	Orangeville	Dufferin.
Robinson, Jabezl	Middlemarch	West Elgin.
Robinson, M	Craigvale	Innisfil.
Ralston, W	Lefroy	South Simcoe.
Rudolph, John	Tara	Arran.
Ritchie, F. I	Brockville	Brockville.
Russell, W. E	Tavistock	Tavistock.
Ryan, M	Paris	Paris.
Reid, C. A	Goderich	Goderich.
Reamon, M	Woodbridge	Woodbridge.
Raikes, George	Barrie	Oro.
Rodgers, John	Thorold	Thorold.
Russell, Thomas	Exeter	South Huron.
Rudell, A	Galt	South Waterloo.
Smith, A. N	Meaford	Grey.
Sproule, R. J	Flesherton	North Grey.
Simpson, Wm	Onondaga	Onondaga.
Stephens, L. H	Campbellford	Seymour.
Stewart, John	Gorrie	Huron.
Smith, Silas H	Craigvale	Innisfil.
Smith, W	Desboro	Sullivan.
Sutherland, R. A	Craigvale	Innisfil.
Stevenson, A	Atwood	Elma.

NAME.	P. O. ADDRESS.	SOCIETY.
Soules, R. T.	Newmarket	Newmarket.
Sparling, Cordelia	Wingham	Huron.
Stock, W. E	Waterdown	East Flamboro.
Sutton, Wm	Erin	Erin.
Sheppard, J. W	Cayuga	Haldimand.
Sullivan, M. F.	Frankford	Frankford.
Simmons, J. W	Frankford	Frankford.
Trick, Wm. H	Thedford	Bosanquet.
Telfer, T. S	Drumbo	Drumbo.
Thomas, H. E.	Windham Centre	Windham.
Todd, Eben	Gilford	North York.
Tully, J. H	Parry Sound	Parry Sound.
Tatham, S	Listowel	Listowel.
Thomson, J	Sharbot Lake	Hinchinbrooke.
Underwood, T. W	Hagersville	Haldimand.
Vansickle, A. W	Onondaga	Onondaga.
Verral, G. W.	Weston	West York.
White, A. H	Chatham	Raleigh and Tilbury.
Wilson, Frank	Wheaton	Thorndale.
Williamson, R. A	Picton	Prince Edward.
Watson, John	Pine River	Huron.
Wade, George	Dorchester Station	North Dorchester.
Wright, Joseph	Beeton	Beeton.
Whitworth, E. J	Binbrook	Binbrook.
Webster, H. E	Shelby Junction	Binbrook.
Wilcox, O. J	South Woodslee	Rochester and Maidstone.
Wilson, J. F	Listowel	Listowel.
Watson, R. J	Shelburne	Dufferin Central.
Wright, Walter	Cobourg	Cobourg Central.
Wood, W	Bradford	Bradford.
Walker, C. H	Erin	Erin.
Watson, Dr	Burlington	Burlington.
Weston, J. E	Tillsonburg	Dereham.
Wallace, T. F	Woodbridge	Woodbridge.
Wiggins, H	Nottawa	Nottawasaga.
Winslow, C. H	Millbrook	Millbrook Central.
West, T. E	Woodstock	North Oxford.
Wyant, Geo. V	Petrolea	Petrolea and Enniskillen.
Wyant, Alton	Petrolea	Petrolea and Enniskillen.
Young, J. M	Harriston	Minto.

ONTARIO ASSOCIATION OF FAIRS AND EXHIBITIONS

ANNUAL MEETING.

The annual meeting of the Association was held in the City Hall, Toronto, on February 20th and 21st, 1907, and was largely attended.

PRESIDENT'S ADDRESS.

By J. W. Sheppard, Cayuga.

It again affords me a great deal of pleasure to welcome you to this the nineteenth annual meeting of the Ontario Association of the Fairs and Exhibitions, and to express to you my sense of appreciation of the sacrifice of time, and the public spirit exhibited by those Boards of Directors and Officers of Agricultural Societies throughout the Province, in endeavoring to advance the cause of Agriculture in this sphere of the many branches appertaining thereto.

During these nineteen years a great deal of useful information has emanated from our annual meetings, and been disseminated throughout the Province of Ontario, accomplishing a great deal of good and improvement in the management of the objects promoted by Agricultural Exhibitions, under the old Agriculture and Arts Act, and which last year culminated in an important movement calculated for still better results to be obtained in the future in holding such exhibitions, by the enactment by The Legislature of Ontario of the "Agricultural Societies Act 1906" which came into force on the first day of February, 1907. By this legislation many radical changes have been made, prominent among which is the method of distributing, in future, the appropriation set apart by the Legislature to assist societies organized under the said Act.

The old method of granting $800 to be distributed amongst the Societies of each Electoral District, has been discarded, and the grant will now be made to each Society in the Province, in proportion to the amount each pays out for agricultural purposes only, during the preceding three years, as defined by section 19 of the Act of 1906.

I would specially call your attention, and that of the Legislature, to a very important and noticeable omission in the section referred to, "viz," that no credit is given to Societies for expenditures on grounds and buildings. This is a weakness in the Act in my opinion, and I would very strongly recommend that it be amended accordingly, the reason for which must be apparent to all.

The attention of Societies is specially drawn to the provisions of the Act encouraging the holding of Seed Fairs and Spring Stallion Shows. The value of this work has been pointed out in the past, and in the future special grants will be made of half the sum expended, but such sum shall not exceed $50. A point I wish to emphasize in this connection is the need that now exists for the Societies to take greater care than ever in planning their year's work. No longer will they receive practically fixed grants as in the past, but their grants are going to depend on the work they do, and it is therefore essential that this work be well done, and every Director of every Society be active and wide awake.

The underlying principle that has been adopted in the Act appears to have been founded on the basis of that old saying, "The Lord helps those who helps themselves," as enunciated by the Minister last year, and those Societies that do not help themselves will lag in the race, and the path of progress will be strewn with their remains.

"Peace hath her victories no less renowned than war," and in this peaceful pursuit let each Society strive to win honest victories, promoting the objects defined by the Act.

It is now desirable that accurate reports be furnished to the Department, of the yearly operations of Societies, in order that justice may be done to all, and that the matter of the appointment of a regular Auditor of Fair Books, should receive favorable consideration. I would recommend that the Government take up the work of a uniform system of Fair Books, to be used throughout the Province, and decide upon some uniform system to be adopted, thus tending to facilitate returns to the Department, and rendering detections of evasions of the Act more easy. It might be well that boards of directors take note of the new provisions of the Act rendering them personally responsible for all the funds of their Society in the hands of the treasurer, unless they obtain proper security for the duly accounting for, and paying over of all moneys which may come into his hands as such treasurer.

The old vexed question of the propriety of speed contests, or commonly termed horse races at fairs, will no doubt be again trotted out for discussion at this meeting. The tendency of the Legislature appears to be to place restrictions upon this feature of a fair, by providing that any Society on proof of its having permitted horseracing at the fair, shall be debarred from receiving any Government grant for the ensuing year. It is difficult to reconcile these restrictions with the privileges allowed the Toronto, London, and Ottawa Fairs in this respect. They are to have $5,000 of a Government grant divided between them *pro rata*, but only subject to the restriction of sections 11, 19 and 28 of the Act. Section 22 being the horseracing section is not included in their conditions. By an amendment in 1905 of the Act of incorporation of The Industrial Exhibition Association of Toronto, the Legislature granted them the right to provide entertainment or amusement to persons visiting its exhibition, by means of music, shows, or other attractions. The term "Other Attractions" gives them unlimited license as to entertainment from horseracing to the midway fakes. The Legislature appears to have been inconsistent in this particular, that they penalize rural societies for providing entertainment by the national sport of horseracing amongst local farmers and horsemen, as the most popular form of entertainment for their patrons, and stamp with the seal of their Legislative approval, popular forms of entertainment and amusement at these city exhibitions, only restraining them by sections above referred to. which are the clauses requiring returns to be made, and the prohibition of immoral and indecent features, and the sale of intoxicants, which clauses I very strongly approve of. However, as there seems to be a divergency of opinion on the propriety of horseracing at fairs, I would suggest that the Government appoint a commission to investigate the whole subject, and the conditions not only in Ontario, but in the neighboring states of the union as well.

I have endeavored to be as brief as possible, and forego reviewing many other important features of the Act, as they will come up for consideration in the address of Mr. Cowan.

The members of this Association, having in mind the many courtesies extended, and the untiring energy and ability of Mr. H. B. Cowan our former Superintendent, will sincerely regret his retirement from the duties of that position, since our last annual meeting, to take up editorial work on the "Dairymen" and other kindred publications, and while we regret his retirement, we wish him success in his new field of labor.

In introducing our new Superintendent, Mr. J. Lockie Wilson, I appreciate the fact that the office has sought a gentleman of wide practical experience and knowledge which will be of immense benefit to the agricultural societies of the Province, and I bespeak for him your co-operation in carrying out his duties.

The programme arranged for this meeting is replete with interesting subjects for discussion, and I hope they will merit your attention and consideration.

Moved by Mr. Riley, seconded by Mr. Laidlaw, that a Committee consisting of William Laidlaw, Guelph; W. H. Gainer, Welland; C. H. Walker, Erin; and J. Thos. Murphy, Simcoe, be appointed to consider the President's address, and report thereon. Carried.

In speaking to the motion Mr. Riley said: I must congratulate the President on the very fine address he has given us. He has summarized the past and the present in excellent terms, and has given us a literary treat. As he has told us, we must all get to work under the new Act. If we are going to participate in the new Act we must keep ourselves close to the wall. I am glad he has expressed himself. These things, connected as they are with agriculture, have so much to do with the advancement of the affairs of our Province. I believe agriculture stands first, and, when we are advancing the different associations connected with agriculture we are advancing the prosperity of the whole Dominion of Canada and I, therefore, have great pleasure in moving that a Committee be appointed to consider the address. At first I thought we might receive the address and put it in the pigeon-hole, but I think there is too much in it to treat it in that way.

The Chairman: I do not think there are any committees ready to report, and we will now take up the notice of motion that was introduced at our last meeting by Mr. J. Thomas Murphy, "That the constitution be so amended that the nomination of officers and directors be made the first order of business on the morning of the second day; the election to take place on the second day at 2 p.m., the secretary to procure printed ballots for distribution among the delegates, and that this notice be printed in the programme for the convention in 1907."

Mr. Murphy: This matter was talked over at our Executive Committee. The great trouble we have had in the past in electing the directors caused me to give this notice of motion. I think it is a very unsatisfactory way of doing business as it has been done in the past. It has been done hurriedly, and I think it would be a good thing if this motion were adopted by the meeting and have the nominations take place at the morning session, and the elections take place on the second day at 2 p.m.

Mr. Riley: I have great pleasure in seconding Mr. Murphy's motion. I think, in former years, there has been too much of a jumble and, by adopting this motion, we will have our election more in order.

After full discussion, the motion was put to the meeting and carried.

The CHAIRMAN: I wish to read the following telegram which has just been received: "Very sorry I cannot be with you. Kindest regards to the old guard, and good wishes for the Convention. JAMES MITCHELL, Goderich." (Applause.)

Mr. H. B. COWAN: Letters were sent to all Societies in the Province asking for suggestions concerning subjects that might be discussed at this meeting, and a number of replies were received. Some of them asked to have subjects discussed which the Executive considered could not be arranged for. The Executive feel that this Convention meets chiefly for the purpose of discussing the management of fairs and how to make them more beneficial to agriculturists. At our last meeting we discussed school children's competitions, and this year one society wants to know if there is any means by which we can have a joint method of advertising fairs. Something of that kind is being done in the Western District Fairs' Association, and I see the secretary is here, and I have a copy of one of their posters, which I will show you. It is a move that I think, possibly, a great many societies might follow.

You will notice that they mention each of the fairs and give the dates when they are to be held, and some of the principal features of each fair.

Q.—How much do these bills cost?

Mr. HENDERSON: About $50.

Q.—Do you consider it is a good way of advertising?

Mr. HENDERSON: They all want them again for next year; we have eight fairs in our Association.

Q.—Do they all pay equally?

Mr. HENDERSON: No, they pay for the bills in proportion to the number they order. Some of the larger fairs take more than the smaller ones. We get 800 bills printed altogether. Strathroy and Sarnia Fairs get 200 each.

REPORT OF THE SUPERINTENDENT FOR 1906.

BY H. B. COWAN, TORONTO.

Upon the first of this month, February, 1907, when the new Act governing the agricultural societies of Ontario came into force, a great change was effected in the conditions surrounding the slightly over 400 agricultural societies of the Province. Restrictions hampering the development of societies that should have been among the strongest in the Province have been removed. Some societies that have been fostered under hot-house conditions, figuratively speaking, have been removed to the open, and in future will have to subsist on the same fare that is meted out to the other societies of the Province.

The next few years will see a great change in the character of many of our exhibitions. Societies that we have never heard of hitherto will force their way gradually to the front, while some of the societies that have loomed large in the public eye, unless their methods are radically changed, will drop back to a more humble position, and in some instances will disappear. This being the case, it will be well for the directors of our societies this year to study their conditions closely, so that they may decide on the line of policy which will be in the best interests of their societies, and of the agricultural sections in which they are organized. The future success of their societies depends largely upon the line of action decided upon this year. It is well, therefore, that arrangements have been made for a thorough discussion of these matters at this convention.

The new Act will be discussed, clause by clause, at to-morrow morning's session. This being the case, I will refer now to only the main features of the Act and their probable effects.

The main defects of the old Agriculture and Arts Act have been discussed at previous conventions. It is not necessary therefore to refer to them at length. Briefly speaking, they were seven in number, and as follows:

1. There was an unjust distinction between so-called district and township societies, by which district societies were given grants that could not be less than $380, and might be as high as $800, while township societies could not receive more than $140. In some cases township societies obtained grants as low as $32. The injustice of this condition lay in the fact that many township societies were expending much larger sums for agricultural purposes than numbers of the district societies, while receiving much smaller Government grants.

2. The grants to the societies were, practically, fixed sums. They were based upon the membership lists of the township societies, which seldom changed to an extent that materially affected the grants. This offered no encouragement to the societies to develop the agricultural features of their exhibitions.

3. The Province was divided into districts, and the sum of $800 was apportioned for division among the societies in each district. This meant that sections where little stock and farm crops were raised received as large grants as other sections much better adapted for the holding of agricultural exhibitions. It encouraged the operation of societies in sections where they were not needed. These societies are likely to be seriously affected by the new Act.

4. Societies owning pure-bred stock received their grants on the same basis as societies holding exhibitions. Societies owning thirteen or fourteen pure-bred animals received practically the same grants as societies owning only one or two.

5. There was no limit other than the number of townships in the Province to the number of societies that might be organized. This led to the organization of a large number of small societies that were of but little value in themselves, and which prevented the development of other and better societies in their respective neighborhoods.

6. There was no provision in the Act for the encouragement of a diversity of work by the different societies. The result was that the great majority of the societies contented themselves with holding only an annual exhibition. When that was over they were seldom heard of again until another year.

7. Agricultural and horticultural societies drew their grants from a common fund. The larger the grants paid to the horticultural societies the less was available for the agricultural societies. This created friction between the agricultural and horticultural societies. In a number of instances the agricultural societies contrived to gain control of the horticultural societies and divided their funds for their own use.

THE NEW ACT.

In the new Act—or rather Acts, as the older Agriculture and Arts Act has been replaced by three new Acts—an effort has been made to remedy these defects. The main features of the new Act governing agricultural societies are as follows:

1. Agricultural societies will operate under an Act of their own, called "The Agricultural Societies' Act." Horticultural societies have been separated from the agricultural societies, and will be controlled by a separate Act

known as "The Horticultural Societies' Act." It has been made impossible for an agricultural society to gain control of a horticultural society, or for an agricultural and horticultural society to hold joint exhibitions.

2. All distinction between district and township societies has been abolished.

3. The giving of practically fixed grants to societies has been discontinued.

4. Fixed grants will be given no longer to various sub-divisions of country through the Province. Instead all the societies have been placed on the same basis. In future they will receive their grants from a common fund and in proportion to their expenditure for agricultural purposes. Societies owning pure-bred stock will be given grants in proportion to the number of animals they own. A restriction has been placed on the organization of new societies by a stipulation making it difficult to form a new society within twenty miles of an existing society.

It is impossible to foretell just how successful this new Act will be, or how it is going to affect each individual society. A somewhat similar Act in the State of New York has proved very beneficial to the societies in that State. There is reason to believe, therefore, that this new Act will benefit the agricultural societies of Ontario.

A close examination of the annual returns of the various agricultural societies for 1903, 1904, and 1905 indicates how the grants to the societies are likely to be affected. Thus we are able to gain some idea of the probable main results of the new Act. It is altogether likely that during the next five years there will be:

1st. A reduction of anywhere from twenty-five to seventy-five in the number of societies.

2nd. An increase in the size of those societies, which under the old Act did not receive a Government grant in proportion to the value of the work they were doing, and which, therefore, under the new Act will obtain decided increases in their grants.

3rd. A reduction in the size of those societies which hitherto have been able to hold fairly large exhibitions, simply because they have received unduly large grants.

As the grants to many of the former township societies will be materially increased, it has been claimed in some quarters that the new Act is little better than a raid by the township societies upon the funds of the district societies. This is not the case. In this connection it is interesting to note that the two societies that are likely to receive the most benefit next year from the change in the Act are both district societies. The North Lanark Society will secure an increase in its grant of approximately $338, giving it a total grant of $719. The increase in the grant to the South Wellington Society will be about $320, which will raise its grant to the maximum of $800 set by the Act. These facts show that former district societies which have been doing good work will be as much benefited by the new Act as the township societies.

The societies that will be the most seriously affected are those that are located in sections where they are not needed. The defect in the old Act by which fixed grants of $800 were given to every section of the Province, with larger grants to the district societies, led in some cases to societies being established where they are not needed. Instances have been known where societies were organized mainly by hotelkeepers and merchants with the object more of drawing business for their own benefit than of helping the cause of agriculture. Some of these have received the district grants, and thus have been able to keep in existence year after year, although they have been of but little value agriculturally. Take the case of such societies as these: One received a grant of $380 and gave $265 for agricultural purposes. Its grant will be reduced by 95 per cent., which means probably that it will go out of existence. Another received a grant of $380 and gave $338 for agricultural purposes. The reduction of its grant will be about $259, and should mean its end. A third society obtained a grant of $431, gave $439 for agricultural purposes, and will have its grant diminished to about $157. The directors of such societies as these, as well as of those which while not so seriously affected, will still have their grants greatly reduced, have a serious problem to face. They should meet, if they have not done so already, and make a thorough canvass of the situation. The first question they will have to decide is whether or not their societies are needed by the farmers of their respective sections.

A noticeable point is that a number of the societies that will lose large portions of their grants are located in the large towns and cities. These societies, with the object largely of drawing the urban population, have gone to extremes in some cases, in the introduction of horse racing and special attractions. The result has been that they have not been expending nearly as much for agricultural purposes in proportion to their grants as other much smaller societies in their immediate vicinity which are located in the country. The result is going to be that the larger societies will have their grants reduced, while the smaller societies that do not appear to amount to much, but which are in the country and cater purely to the people, are going to be greatly benefited. A case of this kind is that of the society in the city of Brantford, which failed a couple of years ago, with liabilities of about $2,000. Near it was the Blenheim Society, in North Oxford, a purely agricultural society, which received a grant of $88 and gave an average of $805 for agricultural purposes. Under the new Act the grant to this society will be increased from $88 to $288.

A number of cases closely similar could be cited. They serve to show what has often been contended, that it is not necessarily the societies that run the largest excursions and engage the most brass bands that are the most appreciated by the farming community. They indicate, also, that cities and towns are not necessarily the best places for holding exhibitions; that they may, in fact, be the very reverse.

GRANTS TO SOCIETIES.

The following information may be of interest. Under the new Act three societies will have their grants decreased by over $300 each, twenty-five by over $200 each, twenty-nine by over $100 each, thirty by over $50 each, and fifty-nine by less than $50 each. Four will have their grants increased by over $300 each, ten by over $200 each, thirty-five by over $100 each, fifty by over $50 each, and ninety-seven by less than $40 each. It thus is evident that many more societies will have their grants increased than there are societies whose grants will be decreased.

THE WORK OF THE YEAR.

Owing to the fact that my resignation as Superintendent of Agricultural Societies was tendered to the Hon. Nelson Monteith early last June, and as I did not know at what date it might be accepted, not nearly as much work was accomplished by me last year on your behalf as I would have liked. Not knowing who my successor would be, or when he might assume office, I did not care to launch out on my new lines of work that a man unfamiliar with the work might find difficult to take up and complete.

Seldom has there been a year when the weather conditions from the first of September until the middle of October were on the whole as favorable for the holding of exhibitions as was the case last fall. In some sections of the Province the rain on the 27th of September, a day on which many exhibitions were held, proved disastrous, but the total number of exhibitions that were affected by rain during the season was unusually small. The general report was that the attendance and interest manifested was greater than ever before.

Many societies—in fact, an unusually large number—improved their grounds and buildings. Several societies spent one to two thousand dollars each in this work. Reports were received from a number of societies that used tents instead of buildings and the officers of some societies claim that it is preferable to use tents rather than incur the heavy expense of erecting buildings, which are used during a comparatively short season of the year. For the information of those societies who may desire to engage tents for this work next year I might state that firms in Ottawa, Toronto, and London, and possibly other cities, make a business of renting tents.

The most gratifying feature of the year's work was the continued success of the expert judge system. When it became evident, early in the year, that the charge to the societies for the services of the judges would have to be increased from $5 to $6, and in some cases $8 a day, it was anticipated that there would be a considerable reduction in the number of applications for judges. Instead of this being the case, there was a slight increase. In all, 185 fairs were supplied with judges. Total number of judges supplied was 124, arranged as follows:

Horse judges, 39.
Dairy cattle and swine, 24.
Lady demonstrators, 12.
One apple packer.
Two fruit judges.
Beef, cattle and sheep, 32.
Poultry, 10.
Carriage judge, 1.
Three vegetable judges.
These judges did, in all, 614 days' work during the season.

As was the case in former years, the total majority of the judges gave the best of satisfaction. A few of the judges did not come up to the mark. The work of some of these men created considerable dissatisfaction, and their services will not be utilized another year. Again I would like to urge upon the societies the importance of reporting to the Department promptly any men whose work indicates that they are not competent to act as judges. Secretaries, although written to and asked to report on the work of new and untried judges, sometimes delay their replies until they have had an opportunity of gaining the views of the rest of their directors. In the meantime the judge or judges in question are attending other fairs and possibly performing unsatisfactory work. Prompt reports on the part of the officers of societies would enable the Department to call such men off the road before they had attended more than two or three exhibitions. Such men fortunately are rare. The great success of the judge system has lain in the fact that the men sent out, as a rule, have been thoroughly competent for the work. Of the 124 judges sent out last year complaints were received in regard to the work of only six.

They also combine in the issuing of advertising bills the exhibitions all at once. This saves the expense of issuing different advertising matter.

An educational feature that was introduced by the Department last year at four fairs in Central Ontario, and at nine in Western Ontario, was a butter-making demonstration, conducted by two lady demonstrators. The reports received from the most of the societies were of an encouraging nature, and showed that these features were much appreciated. A charge of $5 a day for the services of these lady demonstrators was made by the Department, and an extra charge of $1 a day where tents had to be supplied. This is a line of work that more societies, particularly those in dairy sections, might undertake to advantage. As many societies this year will need to carefully consider the position in which they have been placed by the provisions of the new Act, I would like before closing to again mention some of the points that I consider essential for the holding of a successful agricultural exhibition:

1st. The society must be located in a good agricultural community, where there is sufficient stock to make practicable the holding of a good fair.

2nd. There must be a strong Board of Directors, the majority of whom should be farmers. These men should be so located that they will be able to help maintain the interests of the fair, and at the same time should meet as often as may be required.

3rd. The Board of Directors should have the hearty sympathy and co-operation of the people of the community. It is almost impossible to hold a successful exhibition without these. Where societies have had these advantages I feel that under the new Act their future is bright.

Again I would strongly urge the societies to engage as many judges as possible and to have each judge judge only one department. It is a very difficult matter to secure judges through several classes. Most of the complaints that have been received against judges have been in cases where judges, at the request of the directors, have consented to judge in departments in which they were not fully acquainted. The Department endeavors to make it clear to the societies that the judges are supposed to judge only those departments for which they are recommended. In some cases, however, more particularly in New Ontario, directors are so anxious to have strangers do the judging that they prefer to have an expert judge at the work even when he admits that he does not consider himself fully competent for the work. While it may be claimed that the judges should not be allowed to judge in these classes the Department has felt that this is a matter that had better be left with the board of directors of each society to determine for themselves, as local conditions frequently are such that it is almost necessary that a judge should undertake the work rather than that it be left in the hands of local men.

Very few lady judges have been engaged as yet at the fairs. This is a branch of the work that it is astonishing more societies have not undertaken. The Department has on its staff several first class lady judges, and as this is a department in which many exhibitions have great difficulty in securing competent judges I would suggest that more societies make use of the judges who are at the service of the Department.

Societies should undertake to start their judging on time. When it is advertised that judging will start at ten or eleven o'clock in the morning, and nothing is done until one or two in the afternoon, it frequently occurs that judges are unable to complete their work before dark, and sometimes have to hurry to get through. This is not fair to the exhibitors or to the judges. The fault lies with the board of directors for not insisting upon the judging starting on time. It is one of the weakest points of many fairs.

A large number of societies erected judging rings this year, and the reports from them show that they were much appreciated both by the exhibitors and the spectators. In each of my previous reports stress has been laid on the need for judging rings. No society is complete until it has judging rings for horses and cattle at least.

In order to avoid if possible all trouble, I would advise the Secretaries of societies, when handing out the judges' books, to request that the judges should hold their own judge's book and mark their own awards. It is possible for the director who holds the judge's book to mark the winners differently from the manner in which they are made by the judge. It is difficult to detect a change of this kind, and the only way to guarantee that such will not be done is for the judges to mark their own books. In making these suggestions I do not desire to cast any reflection on a great majority of the directors of our agricultural societies whom I know are far above any form of fraud. However, we know that such things as this can and have been done, and therefore it does not pay to overlook them.

The Central and Western District Fairs' Association both have done valuable work last year in harmonizing the interests of their local agricultural societies and in helping arrange the dates of their exhibitions. It would be well to have some of these associations formed in other parts of the Province. Last year the Western District Fairs' Association made most of the arrangements with the Department for demonstrations in butter making which were given at a number of the fairs in that section.

Another pleasing feature of the work was that there were probably fewer games of chance operated at exhibitions than has been the case for many years. The campaign that has been carried on by the Department against these features has had its effects throughout the country as now where the directors of an exhibition are lax in prohibiting this practice at exhibitions the public is apt to enter protest.

At one exhibition in Parry Sound district last year the secretary of the society arrested a fakir who was fined $100. This had quite an effect on all the fairs in that district.

Spring Stallion Shows.

The number of spring stallion shows held in 1906 was ahead of all records. There is an increasing interest taken in this line of work. Last year a special grant of $1,000 was distributed among the societies that held these exhibitions. This year under the new Act governing our agricultural societies a grant as high as $50 will be available for those societies who held these shows and it is to be hoped that many will take advantage of it. A description of how these shows are conducted may be found in my annual report for 1905.

Only one or two societies held spring seed fairs. This is a line of work that will be assisted financially this year and in the future. Societies that agree to undertake to hold these fairs will be given liberal assistance by the Dominion Seed Division. Arrangements can be made through Mr. J. Lockie Wilson, Superintendent of Fairs.

In conclusion, this will be my last report as Provincial Superintendent of Agricultural Societies, and in tendering you my resignation as your corresponding secretary and editor, I feel I must express my regret that the relations which have existed between us in the past are to be severed. It has been a pleasure to be associated with you. I have felt always that each and every one of you have had the best interests of our agricultural societies at heart.

When I appealed to you for your help and advice, it was always forthcoming. You have been very lenient with my short comings, numerous as you must have realized them to be. During the almost three years I held office I did not accomplish nearly as much as I hoped would be the case. Many of my pet schemes have not been even touched. Practically nothing has been done toward working out a system of fairs insurance against rainy weather; nothing toward grouping out exhibitions in circuits with a competent superintendent or agent for each; almost nothing towards devising a uniform system of fairs books, and little or nothing towards many others. I have only one excuse. Shortly after assuming office, it became evident to me that some at least of these innovations would never be accomplished until our agricultural societies were placed on a more satisfactory footing, and the whole basis upon which they operated was changed. My chief attention, therefore, at first was devoted to showing the need for such a change, and more recently to devising some new system that would remove the restrictions that were hampering our societies.

While desiring to claim only a share of any credit that may be attached to the passing of a new Agricultural Societies Act, I feel that I may say that it embodies the principles for which I have been striving from the first, and which I hope will prove of great benefit to our agricultural societies as a whole.

My successor, Mr. J. Lockie Wilson, has long been active in promoting the agricultural interests of the Province. His experience as an officer of an agricultural society, as an exhibitor and as a judge, has extended over many years, and has fitted him for the responsible position he now holds. For him I desire to bespeak the same kind sympathy and support that you have so freely extended to me, and to express my confidence that, with your assistance, he will be able to accomplish much that will be of benefit to our agricultural societies.

The acquaintances and friends that I have made among you will always be prized, and it is my earnest hope that we will continue to be as warm friends in the future as in the past. While no longer actively identified with you in the work, my thoughts and best interests will be with you in your efforts to make the agricultural societies of Ontario the best in the world.

There is nothing to prevent an Agricultural Society from offering prizes for flowers and fruit, but they must use their own funds.

It is a most singular thing that very often you will find a Society in a city, and they make complete failures of their exhibitions, and yet you will find a little country exhibition, perhaps twenty miles away, that is a great success and nearly everybody in the city, one day in the year, gets a rig and drives out into the country to attend that little Exhibition. I will guarantee there are a great number here who know of Fairs like that. I do not know why so many people want to see a Fair in the country, but it seems to be the case. Brantford did not make a great success of their Fair. Pembroke tried to hold a Fair and failed and yet they have a little Fair down near Beachburg that is a great success, and these little fairs are likely to come to the front under the new Act. As you have arranged for the discussion of the Act to-morrow, clause by clause, we had better leave off that matter until then.

One new feature, that we took up, was the introduction of butter making competitions at groups of fairs, and there is where the district associations are of great benefit to the Department. As soon as we decided to try that I immediately got in touch with Mr. Henderson, Secretary for the Western District. We covered four Fairs in Central Ontario and nine in Lambton County and, while I have not got as complete a report as I would like to have, the general report was that they proved a success. Several societies were quite enthusiastic about that feature of their work.

So far as the judges engaged are concerned, we believed at the outset of the year, that we would not have nearly as many judges as the year before, owing to the fact that we found it necessary to increase the charges to the societies.

Mr. A. Norman Smith, President Meaford Fair, Grey County: Does not the new Act discourage the putting up of new buildings?

Mr. Cowan: According to the new Act, societies will not get credit for expenditure on grounds and buildings, and I believe that is a serious defect in the Act. (Applause.) A lot of our best judges disappointed us last year. We sent out one man who was a good horseman; he kept good horses, and we thought he would make a good judge, but he was a failure, because he talked too much. We did not get reports from the Secretaries as quickly as we would like. We wrote to the Secretaries and asked them to report immediately, especially in the case of a new and untried man, but sometimes the secretaries waited four or five days, and in one case a poor judge went around a whole circuit before we got him stopped. If the secretaries would report promptly we could take a man like this off the road at once. I would not take a man off because we got a poor report at the first Fair, because sometimes our very best judges receive poor reports for some reason.

Last year there was a tendency to criticize the expert judge system. The best proof that they are giving satisfaction is that they are applying for them more and more each year.

A judging ring does not cost much, and I would say put up a judging ring before you put up a building. It is practically impossible for a judge to do good work when he has a big class, and the crowd is all around and in between the animals, and I have never yet heard of a society that regretted putting up a judging ring. If you cannot put up a proper one, put posts in the ground and run a rope around.

I would suggest to Mr. Wilson that next year he should instruct the judges to mark their own books.

A Member: Some of them won't do it.

Mr. Cowan: They should be told that they must do it. A director may be absolutely honest, but the fact that people think he has got a chance to do something wrong will make them say there is crooked work, and, for the protection of the directors, I would say it would be much better to have the judges mark their own books. A $5,000 grant was made to assist the horse industry last year, and $1,000 of that was devoted to assist spring stallion show. That money was handled through the Live Stock Branch, and I had little to do with it. I understand that all societies that hold spring stallion shows get a share of the grant.

Mr. George Downey, Bolton: I was lead to believe that the distribution of the grant was in proportion to the money that was expended for agricultural purposes. Is that right?

Mr. Cowan: The money will be in proportion to the amount expended by each society for agricultural purposes. Some societies give practically every cent for agricultural purposes while other societies give more for horse-racing and special attractions.

Mr. Laidlaw: What do you call agricultural purposes?

Mr. Cowan: That is touched on in the Act, and I presume will be discussed to-morrow.

A Member: You will admit we must haye attractions of some kind. What do you think is a just percentage for that purpose?

Mr. Cowan: That subject will come up to-morrow.

Mr. Broderick: Is it permissible for any other society than an agricultural society to participate in this grant for spring stallion shows?

Mr. Cowan: Under the new Act I would say no. The $1,000 that was given out last year was distributed in such a way that any society could get part of it. This year, recognized Agricultural Societies, organized under this Act, will get a fair share of this new grant.

Mr. A. C. Gray: You are distributing the money on the basis of the prize list, and I would like to know whether you will consider a case where a man puts in $20 for a suit of clothes, and another $13 for a plow, and somebody else $5 for a scuffler, do you add that in?

Mr. Cowan: That is another question which will probably be up to-morrow morning.

Mr. Gray: There could not be a greater injustice if that is the way it is going to be distributed.

A Member: We anticipate holding a spring stallion show, and I was lead to believe that all societies were not eligible to draw from that fund.

Mr. Cowan: All societies operating under the Act are entitled to their share.

A Member: When will the societies know the amount of their grant for next year?

Mr. Lockie Wilson: That will depend upon the speed with which the societies make their returns. We have to get in all returns before the grant can be figured out. If the societies throughout the Province will hurry up their returns and get them in promptly, we could make the apportionment and let them know very promptly the amount of their grant. The returns are not all in yet.

Mr. Cowan: That brings out the point that I tried to make last year; the need of some official who could look after the books of the different societies. I was asked the question to-day, by the Deputy Minister, if there were not mistakes in the reports, as sometimes we do not get the reports for some months after the annual meeting. I feel that there is plenty of work for a man who would go around and look after the books—a sort of inspector. Under the new Act the societies are going to get their grant in proportion to the amount expended for agriculture, and it is necessary that the books should be kept in a uniform way. There are over 400 agricultural societies in the Province.

A Member: Don't you think that, if a society did not make its return at the proper time, its grant should be cut off?

A Member: No.

Mr. Murphy: Was not there a resolution passed that the Government should carry out the law, and that where reports were not in in time the society should lose its grant?

Mr. Cowan: I do not know that it would be fair to cut off the grant of a society whose return was not in. Perhaps it would be the fault of one man, and it is hard to penalize a whole section for the fault of one man;

but I think a fine of so many dollars a day for delays would bring them to time, and it would be quite in order for you to pass such a resolution.

A MEMBER: Would it not be well for the Government to issue a form of book to each society, so that they could have their accounts kept in a uniform manner?

MR. COWAN: That is a matter to which I have been trying to give attention during the past two years. I am not an expert bookkeeper, but at different times we have had meetings of the secretaries, and the best meeting was at Simcoe some years ago. There is a great difference in the method of keeping books. Some of the secretaries have been at the business for forty years, and they would not change. I have applied to the Copeland-Chatterson Company, and I have written to the States trying to devise a system, but as yet the work is in rather an uncompleted state. I think an auditor going around would be able to devise something that would meet the requirements of all the societies.

A MEMBER: While we are on that question of a grant to agricultural societies, would it not be well for this Association to pass a resolution memorializing the Government that they should not give a grant to any society that did not duplicate the amount? In your report you mentioned societies that do not give as much for agricultural purposes as they do for attractions. Is it not proper that the society should do as much for agriculture as the Government is doing? I think they should do more.

MR. COWAN: That is a suggestion I have heard advanced on several occasions. Theoretically it is all right, but I do not believe it would work out in practice. In the first place a lot of societies are on the border of that, and a great many societies are giving more than they are for other attractions. We have societies that give $10 for $1, and other societies do not give nearly as much as that. I think the way the grant is made now is equitable, inasmuch as the societies are going to be paid in proportion to the amount that they spend.

A MEMBER: There should be a maximum and a minimum amount that the societies should spend before they are entitled to the grant.

MR. COWAN: That subject was discussed at our Convention two years ago, and it was decided it would be impracticable. There are some sections where they cannot spend very much, and yet they need a fair. This is the case, especially up in New Ontario, and the minute you begin to set a hard and fast rule you would be surprised how many exceptions there are to it.

A MEMBER: Have they to have a certain number of members to constitute a society before they are eligible for the grant?

MR. COWAN: The average is about four to one, or perhaps five to one, that you have to spend. You have to spend $5 for agriculture for every one you get from the Government, and the law makes it compulsory that it should be carried out.

MR. WHITE: Would you not think that a society that spends $800 or $1,000 in buildings for the purpose of showing stock, cattle and horses ought to receive some credit for that? Don't you think that is money expended for agricultural purposes?

MR. COWAN: Yes, I do consider that is so, and I will discuss that tomorrow morning.

A MEMBER: Last year it was recommended that the books of the secretaries of agricultural societies should be similar to those kept by secretaries of Farmers' Institutes.

MR. COWAN: It was suggested and discussed, but nothing was done.

A MEMBER: I think it would be wise if it was done.

Mr. Cowan: The keeping of accounts of Farmers' Institutes is much simpler.

Mr. Clark, Goderich: Is there any set date when the returns should be presented to the Government?

Mr. Cowan: Yes, there is a fixed date. I noticed in to-day's paper that a certain town up in the country held its annual meeting yesterday. If it is shown that something is needed and desirable, for instance, this question of the expenditure on buildings, I think the Act might be changed so as to cover it.

Mr. William Laidlaw: I suppose it would be hard to get a law that would suit everybody. We were not satisfied with the old Act, and now that we have a new Act I think it is only reasonable that we should give it a good start. I know it will hit some societies hard, but they have got to make a start some place along new lines, and I think they have started on proper lines. I think that the total amount given by the Government might be made larger. I think, also, that we, as representatives of the Agricultural Societies of the Province, here to day should endeavor to better our own circumstances, because, after all, the success of every show depends upon the active management at home, and, if we are going to work in our own societies at home, and make them as good as we can, we will get as big a share of the grant as we are entitled to. I am perfectly willing that we should give the Act a trial for a few years. You will find that amendments are required, continuously, to any law. The Government might be induced to set apart a certain other sum for the purpose of assisting in putting up buildings, but I think we should deal with these shows from the standard of the prize list. I think that is the best way to work.

Mr. M. A. James, Bowmanville; There were four societies whose grants would be very largely increased by the new Act. What local conditions will make that?

Mr. Cowan: I would have to look at what societies they are. North Lanark and South Wellington are the two that get the largest increase. North Lanark is thirty or forty miles from Ottawa, and is centrally located on the railway. It does not give anything for horse-racing, but they make a specialty of horses, and they have offered as high as $25 as a special prize for horses. Their average grant has been $321, and their average expenditure for agricultural purposes $2,011. In the case of the South Wellington Society at Guelph, their average grant has been $481, and the average expenditure $2,677. Their new grant will be $800. I believe it would have received over $800, but the maximum was set there.

A Member: Is that $2,011 spent purely for agricultural purposes?

A.—Yes.

Q.—Did South Wellington have horse-races?

A.—Yes.

Q.—I believe there has been considerable preliminary work done towards getting up a uniform book for secretaries. Has there been enough work done to put it in first-class shape?

Mr. Cowan: No; we want to have a meeting here this morning to discuss that. Mr. Wilson wrote to the secretaries of all societies, and asked them to be here with their books, and we want to have a meeting here to-morrow morning.

A Member: I think it would be a very good thing if we had a uniform book for all societies. You recommended that an inspector should be sent around to all societies, and I think it would simplify the matter a great deal if the secretaries had a uniform book to go by, something similar to the book the Government send out to the town treasurers.

A MEMBER: Any society giving $2,000 for agricultural purposes will have received that larger grant?

MR. COWAN: Yes; they will receive it just the same. There is nothing to prevent societies going right on up in proportion to the work they do. Societies that get an increase this year will, probably, get another increase another year, and those that get a decrease will likely get cut further the year following. Societies that have not been getting justice will now get more money, and they will grow.

MR. LAIDLAW: If they all increase there will be a tumble for some of them, because there is only a certain sum appropriated.

A MEMBER: I would like to move a resolution that the Government give a special grant to all societies that have been in continuous existence for fifty years. We are a mining country, and the farmers of this country will never get a dividend from the mines unless we get it through our agricultural societies, and I would like to get my dividend from the mines. I believe the Ontario Government can go to Cobalt and lift all the money they want, and why cannot we get a dividend out of these mines for every society that has had an exhibition continuously for fifty years?

MR. COWAN: I think you had better take that up through your local member.

MR. J. THOMAS MURPHY: I have great pleasure, indeed, in moving that a vote of thanks be tendered to Mr. Cowan for his report for the last year, and, in doing so, I would also like to add that the thanks of this Association be tendered to Mr. Cowan for his courtesy to the members while he has occupied the position of Superintendent of this Association. We have received every help from him, and we feel grateful for it; and I therefore move that the thanks of this Association be tendered to Mr. Cowan for the able way in which he has conducted the affairs of the Society in the past.

MR. M. A. JAMES, Bowmanville: I have very great pleasure in seconding that motion. I have had more or less intimate connection with Mr. Cowan during the years he has occupied the position of Superintendent of Fairs. I know that his whole heart has been thrown into that work. He has worked assiduously in trying to perfect matters in connection with the Fairs of the Province. I do not know any man in Canada who is more entitled to the thanks of the farming community than Mr. Cowan, for the efforts he has put forth to make our fairs more satisfactory, more practicable, and more beneficial, and I have great pleasure in seconding the motion.

The motion carried by a standing vote.

ADDRESS.

BY HON. NELSON MONTEITH, MINISTER OF AGRICULTURE.

I feel signally honored at being asked once again to address this gathering. It is my privilege to welcome you back to our capital city, to discuss the means whereby the great branch of agricultural effort which you represent may be helped onward in the good work. We have been blessed by a kind Providence with a bountiful harvest during the past year, and we all know what an important bearing this has on our continued prosperity as a people. To the work done by our fairs is attributable to a great extent the high standard of excellence attained by many of our products, and the splendid specimens that have been produced on our Ontario farms, and shown at the numerous fairs throughout the Province during the past season will have a great effect in stimulating our farmers to do still better the coming year. When we consider the vastness of the work in which you are engaged, and the fact that those gathered here represent some four hundred different shows in the Province, we can form a slight estimate of the importance of that work to the community.

As you are well aware, when we met last year our minds were somewhat exercised over legislation dealing with Agricultural and Horticultural Societies. That legislation is now on the Statute Book, and we are ready to continue educational work under the new conditions that have been provided. The legislation of the past season may not be perfect, but it has been given you in response to the desire expressed at meetings such as this one, held during the past few years. I am not going to dwell on the merits or demerits of the Act. There may be defects—in fact, we get many complaints and requests for special grants to cover certain conditions—but I ask you in all fairness to give the Act a trial. Try to make it a success. It is based on the experience of years put into concrete form as a Statute, and I trust it may prove more satisfactory than the Act you have been working under in the past.

When we consider with what important problems our agricultural societies have to deal; when we remember that we have in our keeping the bringing up to a higher standard the agricultural production in this Province, which represents nearly three hundred millions of dollars, we understand how weighty a responsibility is cast upon us. It is for this reason that I maintain that these shows must be made as instructive as possible. Only by educational effort can the great cause which you have in hand be furthered. One thing that has struck me in my little experience in dealing with this matter is that we are not doing as much as we should in trying to educate by contrast; and by that I mean that as well as bringing to a central point all the best productions, we might also add exhibits of imperfect productions and trace up the reasons for their imperfections. I think in that way much of our work would have a greater educational value. I have been lead to believe that this line of work is followed up largely in many parts of Germany, and it appeals to me as a practical thing. It has been adopted in a small way at many points, but I think it might be enlarged upon.

Then we have another branch, namely, the Horticultural branch, to which I wish for a moment to refer. We have many ardent horticulturists in our urban centres, men who give a great deal of their time and money and effort towards forwarding horticultural interests, and in trying to arouse a love for the beautiful, which is indeed a very proper ideal, and one at which we may well aim in every line of agricultural effort. This is to be commended, and when the Bill was under consideration last year it was thought that a larger sum than heretofore might be granted for horticultural work. As you are all aware, agricultural societies and horticultural societies are now two distinct organizations, and I trust that they will give the results that we anticipate, through the passing of the new Act.

In passing to and fro in the Province it has struck me that possibly we are lacking in some of the old-time enthusiasm which was manifest in the earlier days of agricultural society work. It used to be looked upon as a great privilege to be allied with work of this kind, and men vied with each other for the honor. It would sometimes appear as though we were becoming a people who are too anxious to get positions wherein there is some emolument, and I feel that this is one of the reasons why this enthusiasm is somewhat lacking. I appeal to you, gentlemen, and I know I do not appeal in vain, when I say that we want more enthusiasm, more public spirit. I appreciate to the full how much self-sacrifice is required on the part of the men who are to carry forward this great work. We do not appreciate to the full what it means to take these positions in the public interest, and to work for the uplifting of our fellow-citizens, and that should ever be our endeavor in matters of this kind. We should aim to promote the general welfare of our fellow-men. When we go back in the agricultural history of this Province we find that our foremost citizens have all along been interested in promoting agriculture, and that same feeling should pervade all classes to-day. We should feel it an honor to be allied with the great calling of agriculture as represented in these great organizations of horticultural and agricultural societies in this Province.

I have one other idea to emphasize, one that I think we may possibly be overlooking. Men lay their complaints before me, and they tell me if we do certain things our gate receipts will decrease. Let us not be too sure that the gate receipts are a measure of the great work that has been accomplished by societies. (Applause.) Let us realize that, while the gate receipts in themselves are very convenient for the paying of prizes, yet large gate receipts may mean that a society is not doing the work for which the money has been granted from the public revenues of the Province. I think the objects of societies are fully set forth in the Act. They are for the forwarding of agriculture, the beautifying of the home, increasing skill in the arts, and a great many other things too numerous to mention that make for better citizenship. These are things we should ever keep in mind. Let us not be too sure that the gate receipts mean prosperity and good work. I should like to leave that idea with you.

During the past year we have had changes in the staff dealing with this important branch of the Department. Mr. Cowan, the late Superintendent, who has been so prominent in connection with this Association for over two years, thought best to enter another sphere of activity, namely journalism, and we trust he will make a success of that work as he did of the work of this Society. The gentleman who has taken his place has been prominent in agricultural effort for a number of years. Mr. Lockie Wilson is now discharging the duties that devolved upon the late Superintendent, and we trust that you will co-operate with him and help him to forward this branch of our work. It is one of the main branches; it is the oldest branch, has the longest history, and, in fact, the whole Department is the logical development of the original agricultural society idea in this Province. Therefore, we have at headquarters a very kindly feeling for you, and we trust that you, representing these societies throughout the length and breadth of this Province, will give your best efforts to help in promoting this work in the future, as you have in the past.

Again I thank you for the privilege of saying a few words to you. I wish you abundant success in your meetings, and that the fairs throughout the Province may be more successful than ever before.

Mr. T. F. **Wallace**, Woodbridge: If I am in order I would like to point out that the honorable gentleman has just said that, as far as possible, in framing this Act, they had taken the advice of this Association, and that they tried to carry out the feeling of this Association. I think in one respect there was a little deficiency in that regard. If you will remember a year ago the matter came up of allowing a certain amount of speeding, and there was a resolution to that effect, and we find the Act is framed so that, instead of carrying out the wishes of the Association, it takes the very opposite side of the question, and it is now so stringent that societies allowing speeding may lose their grant. Maybe the honorable gentleman is not aware of that fact, and I will just call his attention to it now.

Hon. **Nelson Monteith**:—This, of course, is the great bone of contention—what speeding means. It is not the intention of the Bill, and I do not think you can read into it, an intention to prevent speeding. The idea is to do away with professional horse-racing. (Loud applause.) The idea is to do away with the animal that comes on the course that almost requires straps to hold it together. That is the kind of speeding machine that the Act is largely aimed at. It comes along and takes the money away, and then the Society feels that the Government grant is not large enough. We are trying to put that class of animal where it properly belongs, and give the horses of the farmers that show speed, a chance, so that the country boys will be in a position to come on what you call a show course, and have a fair chance. (Applause.) That is the way I feel about it. That is the spirit of the Act, and I think that after all, there are very few who will find any great fault with it. The idea is not to do anything that would hinder the horse industry of this Province of Ontario. (Applause.)

Mr. **Wallace**: The instructions given by the late Superintendent were more strict than the Act intended. The Act was not so bad, but the instructions of the late Superintendent put a more severe construction on the Act than is warranted by the wording of the Act.

Mr. **Walker**: I was quite pleased to hear our Minister speak in such terms as he has. You are well aware there is a great contention, at the present time, as regards horse-racing in this Province. I consider that it is detrimental to the Society to make horse-racing one of the principal parts of its work. In the Township of Erin Agricultural Society, which is one of the foremost Agricultural Societies in the Province, we never had, and never have considered, horse-racing one of our leading attractions, but still I feel that horse-racing has a place, and the new Act, as it stands, condemns horse-racing. Therefore, I am glad to hear our Minister take the position he has.

Mr. A. S. **Allen**: I represent Tilbury West and North, and I would like to say that we look on horse-racing with a different view from what a great many others do. We put horse-racing on partly as an attraction. We try to place our racing so that it will encourage the farmer, and the citizen generally, to develop young stock. We always have a class for young stock. A great many members of our Society have fast horses, and, as I understand, some of the instructions we got, we cannot have class racing any more. We can hardly have racing without having class races. We always endeavour to make it so that the farmer with a green colt will have a chance to show his horse. A great many good horses have been sold in our locality just through showing them in the races. Ten or twelve years ago we did away with horse-racing for a few years, and we started to go behind. We had a nice track, but it was not paid for, and we contemplated selling part of it to pay for the balance. Some of our directors proposed that we give a little horse-racing to try and draw the people and make a little money, and try to pay for the track. We did so, paid for the track, bought buildings, paid for them, erected stables, put down an artesian well, and we have money on hand to-day. We do not like to go back, and we would like to put on horse-racing as an attraction. (Applause.)

Mr. **Gould**, Uxbridge: I presume our Minister came here to address us, but it appears the meeting has a right to ask a few questions and, therefore, as Secretary-Treasurer and past President of Northern Ontario Agricultural Society, and having had some considerable experience with regard to conducting Fairs, I would like to say a few words. We recognize in our Township the position the Government is in. They are doing everything in their power and they sent out requisitions to the different societies throughout the Province in order to receive their opinion with regard to the duty of the Government in legislation along these lines. We had our Mr. Hoyle with us on the occasion of our annual meting, and he listened to the discussion, and asked our Board to prepare a resolution to be submitted to the Hon. Mr. Monteith. The discussion at that meeting was not to ask the Government to do away with the clause in the Act with regard to horse-racing, but it was this: The best men in our section had devoted their time and money to build up an Association for the benefit of the farming people, and we did not think they should be put in a position whereby they would be liable to a $50 fine or imprisonment in jail. They said they had every confidence in the Minister of Agriculture, and were quite willing that the Act should remain as it is, provided they eliminate from it the privilege that is given to any Tom, Dick or Harry, who walks through the streets, who has no interest in our country, to have our Directors brought before a magistrate and fined $50, or sent to jail, because we have speeding in our ring. If you attend our Fair, or almost any Fair, you will certainly see speeding of some kind. We are perfectly satisfied that, if it is left to the Government, and if the Government have Inspectors, whose duty it will be to go around and look after that matter, that the Government should prosecute us if we violate the Act; but, if the Act is left as it is, our best men will withdraw. I have, myself, a coal business and a mill business, and I am Secretary-Treasurer of that Fair, because I have the interests of the community at large at heart, and I do not think the Government should put me in the position that I would have to go down to the common jail.

Mr. HENDERSON: I represent West Middlesex, and I would like to give my views with regard to what I consider attractions. It seems to me that racing comes under attractions. We all look to Toronto, the capital city of this fair Province, and we all look upon this Industrial Fair that takes place every year as one of the greatest spectacles that we have in the whole of North America. There is nothing like it in this continent, and I say, if this fair city can pay a man like Dr. Orr to manage a Fair like that, and send him to Europe and to England, Ireland and Scotland to get the best attractions that he can get, in order to induce the people from one end of this Province to the other to come down and see what they have in the way of industrial enterprizes, and the best that can be produced in the arts, and the best that can be produced in cattle and in machinery; if it will pay the city of Toronto to get the best attractions, why will not the same principles apply to all the little fish that are in a smaller stream in the small towns and townships, that are trying to develop the very best they can for agriculture? I think that a great number of the things that are produced in the city of Toronto are just as demoralizing with regard to the morality of this country as any horse-race I have ever seen given in the Province of Ontario. (Applause.) I am not here to cast any reflection upon the Minister. I believe he will give us just what we demand if we are strong enough to fortify our position, so that we can get it; and, if we are united, we can have just what we want. But I do not think we have the right to say to the Government, when they give us all the money they are giving us, that we shall spend that money in any way we see fit. I have been Secretary in West Middlesex for fourteen years and we have spent a little more money in the way of attractions, but, at the same time, we have given from $500 to $1,900 for purely agricultural purposes, and we have given $800 for attractions. We paid $720 for speeding specialties and $190 for prizes, and the receipts from the grand stand were $240, and I claim that the horse-racing did not cost our Society one cent, and it helped us to expend hundreds of dollars for agricultural purposes that we never could have had in any other way.

Mr. ALEX. MCDONALD, Dufferin: I take issue with what has been said by some of the gentlemen, when it is said that last year the Government was asked to allow horse-racing at Fall Fairs. That did not take place. There was a division. There were a great many delegates who voted for that and a great many who voted against it, and I can tell you that I am in accord with the Minister of Agriculture. We are allowed the privilege of placing our best horses in the ring, style and speed to be considered. Is that right?

Hon. NELSON MONTEITH: That is right.

Mr. MCDONALD: That is all that any agricultural society should ask in connection with the Fall Fair. You should look upon a Fall Fair from an educational standpoint. I made a statement in this hall last year that the result of horse-racing had sent some of the very best men we had in our country to the wall, (hear, hear), and I make that statement here again, and I do not think there is a man in the hall who can successfully contradict it. I am President of the Dufferin Central Agricultural Society. Six years ago we were $700 in the hole and we have paid off that $700, and, when we wound up our affairs last year, we had $900 in the treasury, and the week before last we bought the property that we have used as our Fair-grounds for $1,500, and we have lived up to the letter of the law, and I can defy any man in the Province of Ontario to come up to the county of Dufferin and say that that Society is not living up to the letter of the law. We have not had any horse-racing. We put our best horses in the ring, style and speed considered. That is all any agricultural society should ever ask for. I agree with what the Minister of Agriculture has said, that at many Fairs, horses are put in the ring that have got to be tied together with straps, and I think it is time that the Government should draw the line.

The CHAIRMAN: The Minister has very little time to stay with us, and I have no doubt he has obtained the views of this Association upon the horse-racing question. There is another important matter we might discuss, and that is the question of the grant with reference to expenditure for building purposes. I fancy the Minister would like to hear the views of the Association on that point in the Act.

Hon. Mr. MONTEITH: I would like to explain that this clause, dealing out such dire vengeance on those who violate the Act, has been in the Act for many years, and I have not had it brought to my attention that anyone has been incarcerated or fined. Whether it has been the laxity of its enforcement I do not know, but the Act stands as it has been for many years past in that regard. There is another point I wish to emphasize. The Industrial Exhibition, of which we are all so proud, has no horse-racing. Style, speed, and value is considered, and the animals are shown on their merits, and they have made a great success of the Industrial Fair, and it is an example for all of us.

Mr. THOMAS: We are going to get into a pretty serious discussion on this horse-racing business, and, as we have a long programme, I do not think we should go into the subject. I take great pleasure in moving a vote of thanks to the Minister of Agriculture for the very able and instructive address he has given us.

Dr. ANDERSON, Central Wellington: I take much pleasure in seconding that motion. There is just one simple question I was going to ask the Minister. At our annual meeting we are told we could not have horse-racing, but, from the interpretation the Minister has given, I think we can have horse-racing under certain conditions. If I go back and tell my board that they will be highly pleased. We have always conducted the racing along these lines of style and speed. I cannot agree with the Minister that the Toronto Exhibition give the prize for style and speed, because I know that ringers, with ringbones and spavins, have taken the prize.

The motion was carried unanimously.

METHODS OF ADVERTISING A SMALL AGRICULTURAL EXHIBITION.

Mr. W. E. Stock: I think this system of having one bill for several Fairs is a good one. There are a great many shows that clash. For instance, in Wentworth we have eight Fairs, and, if we should meet together and advertise them all on one bill, there would be no clashing, and, when you are sending around expert judges, it would be very handy. Therefore, I think it is a grand scheme. I never thought of it before I saw that bill here to-day. We have adopted the plan of advertising our Fairs seven or eight days before. We get a small poster struck off in large letters, and we print the word "Waterdown" in large letters and the date, and nothing more. It is a cheap way to advertise, and it seems to catch the people, but this system of joining together in one bill I think would be better, and would prevent clashing.

Mr. Henderson: That bill was got out by what we call the Western District Fairs' Association, comprising the Fairs of West Middlesex and the County of Lambton. The Association was formed some two or three years ago. We meet two or three times each year. We had a meeting a couple of weeks ago and we arranged the dates for the Societies in the District. Up to the time the Association was formed there was considerable clashing of dates, but since that time, we have no clash as to the dates. Each year there are 800 of these bills got out. Strathroy gets so many, and Sarnia so many, and each of the seven other Fairs so many others, and the whole thing costs about $50. I do not think it could be done for four times that amount if each Society got out a bill. In addition to this large bill each show does a certain amount of advertising in the local papers. At Sarnia we do most of our advertising by furnishing the local papers with a certain number of local items, and we find we get better results in that way, than by display advertising.

A Member: Do the papers charge much for these locals?

A.—No; they do not charge us anything.

Q.—What was the cost of advertising for the Sarnia Fair last year?

A.—I could not give you the exact figures, but I think $25 would cover it.

The Secretary of West Middlesex: At Strathroy, in addition to the large poster, we get five hundred half-sheets and distribute them; because in a poster like that, where nine societies are on the same bill, there is very little opportunity to say very much about each society, and, if you have a good show, you cannot say too much about it.

IS IT ADVISABLE FOR AN AGRICULTURAL SOCIETY TO APPOINT A SUPERINTENDENT OR MANAGER?

By William Laidlaw, Guelph.

We have discussed advertising and so on, and I am asked to discuss how to manage a show—should we appoint a superintendent or manager? I think it is rather a complication of terms, because, I think, to all intents and purposes the secretary must be the manager of the show. The secretary has all the details before him, and he must have the managership, and the Board of Directors must carry out these details for him during the days of the show. All I can tell you about the manager is what we do at our show. It depends very much upon the local conditions and upon the position of the grounds and buildings. If you have one main building, one superintendent can do all the work in the main building; but if your buildings are divided you require to have a superintendent in each building, and you require a superintendent for each particular department. It would be impossible for one man to be superintendent of the poultry department in one building and superintendent of the ladies' work in another. We appoint one man to be superintendent of the grounds. He has charge of the cattle stables, horse stables, and pig and sheep pens, and he has to look after the fences on the grounds; and, when the show opens and the things begin to come in, it is his duty to see that all the stalls are bedded and everything in proper shape for the exhibitors. It will not do for us to be idle. As the Minister has told us, we must show enthusiasm in these things, and always be ready; and the only way you can get people pleased with your show is to please them when they come. We appoint one superintendent for the outside department, and we appoint a superintendent for a number of the inside departments. For instance, we have a superintendent for the ladies' department and fine arts work, and a superintendent for the poultry department. We have about 900 entries in that department, and it is quite a lot of work for one man to attend to; in fact, he has got to have assistance; but we make one man responsible for the work. Last year we had a children's department. We had a superintendent for that, and I do not know that there has been an exhibition of children's work equal to it in any part of the Province. In fact, the professors from the Agricultural College and Mr. Putnam, Superintendent of the Farmers' Institute, said he had not seen anything like it in Canada. We appointed a superintendent for each department. We must keep our show to the front, and if we do not do that we will fall into a rut. To avoid that we must keep continuously changing, and we have found it a good plan not to exhibit the same articles in the same place each year. This year in our main building we reversed the order of things altogether, and you would be surprised at the difference it made. We put the fine arts in a part of the building where the ladies' work had been formerly, and *vice versa.* We must get new ideas. That is all I can tell you in reference to this work. If any points are brought forward that I can clear up, I shall be very glad to do so.

A Member: Will you kindly designate the difference of the duties of the president and the superintendent?

Mr. Laidlaw: I think that would be very hard to do. I think the president's duty, at the time of the show, is very largely to make himself agreeable to the people when they come. He is not supposed to be a working man on that day. He is supposed to be an honorary member, not supposed to do any work but receive the guests.

A Member: How did you conduct your show before you adopted this plan?

Mr. Laidlaw: We have had this plan all along. There is too much work falling upon a few of the directors at the time of the show. We generally appoint a director to be superintendent, but for superintendent of the grounds we have had a man who is very good at that kind of work, and he assists us without any charge.

A Member: What is the nature of the children's department?

Mr. Laidlaw: We offer a very large list in this. We had our list prepared by a professor of the Agricultural College. We give prizes in Nature Study, Domestic Science, Manual Training, and work of that kind. Prizes are given to children of the city schools and the rural schools. Copies of our list were distributed largely throughout the Province last year, and we found that it was one of the best things we could adopt. We paid out $279 in cash prizes in that department, and it was all taken. That will give you an idea how interested the children were in the work. We offered a $5 prize in each section, and we had over 500 entries. The exhibit took up a very large space in our building.

Mr. Walker: The Erin Agricultural Society has a superintendent of grounds, and we have had lime-light exhibits.

A Member: I think we are doing a great deal of injury to the rising generation by inducing children to come from a radius of fifteen miles to our fairs. We have six fairs in our section, and if we brought the children from each section immediately after the school term opened, every school would be closed on the Tuesday, the next fair would be on the Thursday, and there would be a week lost, and the next week there would be a fair on Tuesday and Thursday; that would be two weeks lost, and so on; and I think it would be better not to induce any board of trustees to shut up their school for three or four weeks immediately after the opening of the term after harvest. I think our children learn just as much in the schools as they would at any of the fairs. (Applause.)

Mr. Henderson: For the past two years the West Lambton Fair has put the name of each exhibitor on the entry ticket of every article, and we found that this created a great deal of interest. For instance, you can pick up the entry ticket on a bag of grain, and you will see whose it is and all about it, and the same with a bushel of potatoes or fancy work.

The Chairman: Do you find any jealousy on that account?

Mr. Henderson: No.

Mr. Boughner, Simcoe: I listened with a great deal of interest to the address of Mr. Laidlaw. The course pursued at the Fair he represents is much the same as ours. I represent the Norfolk Union Fair. The idea is that upon two men rests the success of the fair—the secretary and the general superintendent. It is always well to have a good president. We have felt it an absolute necessity to have a good superintendent. Many of you have been down to our fair at Tilbury. We have a general superintendent whose duty it is to see that everything possible is done to get everything ready before the fair opens. He has charge of the grounds and buildings and the employment of men to look after the fair, and on the morning of the fair he is the busiest man, outside of the secretary. There will be this and that and the other thing to attend to. He will have to go to the right and to the left, and it is impossible for him to leave the grounds. A certain man may be appointed to a position and he is not there, and that has got to be looked after. In the smaller fairs I think the president might act as general superintendent, but a man might make a good president and yet not be a good man for superintendent, and I think it is best to have a good, active man as superintendent.

The Chairman: Do you pay your superintendent?

A.—Yes, he gets $40 a year for his services.

A Member: I think the superintendent is a most necessary man, and one of the most important men in the show. We have a superintendent who is paid by the year. His duty is to look after the grounds the whole year through, and I think it is a great mistake for any society to try and run a show without a superintendent. We have only one superintendent, and he also attends to the running of the booths and takes that work off the secretary's hands.

Another Member: I cannot understand how any society would think of conducting a fair without a general superintendent, and a man appointed to superintend each part of it.

A Member: I come from the County of North Essex, and I have been a director of the Great South-Western Exhibition. We appoint a committee of management for each department, and we have one superintendent who governs the whole fair. The duties of our president are honorary.

Mr. Downey, Bolton: We have a committee that we call the Grounds Committee, whose duty it is to look after the grounds. We have four or five young, active fellows from the town, and I think this is the best class of men you can have as directors or officers of any society. I would like to ask my friend over here whether he appoints his general superintendent from the Board of Directors?

A Member: In our society he is always appointed from the directors. We have a union society, and we have more directors than they have at some fairs. After the first meeting, after the election of officers, the general superintendent is appointed, and he is always appointed from among the directors.

Mr. D. S. Hanmer: The first thing we do is to elect a board of directors, then we appoint a superintendent. He has charge of the grounds, selling concessions, and things of that nature, and then we appoint a superintendent of each department from our directors. We have a meeting before the fair, and we insist on each director who is appointed to superintend a department being there in the morning and looking after his department. We never have any trouble. The superintendent looks after the grounds. We hire a double rig and take our visitors through the fair grounds, and we do not take our hats off to even the Norfolk Union Fair.

A Member: I was highly pleased at what Mr. Laidlaw said. He touched a number of good things. One thing he mentioned especially was variety. Variety is the spice of life. You should change your bill every year if you want to attract, and you must advertise. I was very much struck with what he said on that point. We have adopted the giving of prizes to children at Bobcaygeon. We leave it open to all children. We gave forty specials last year. You cannot encourage school children too much; because, if you get them interested you are sure to have the interest of the parents.

A Member: Do you ever have any trouble with exhibitors by changing their places in the main building. They often fix them up especially.

Mr. Laidlaw: We fix them up for them ourselves. Some departments you cannot change around very much. I was referring more to the exhibits for which you offer prizes. Some of them change exhibits for their own advantage. They believe variety is the spice of life, and, therefore, they keep changing.

A MEMBER: We have had exhibitors who would not show unless you gave them the same space.

MR. LAIDLAW: Mr. Downey said he appointed a committee to look after the grounds. I would like to ask who looks after the committee?

MR. DOWNEY: We have a chairman of the committee, and he looks after them.

MR. SHARP: I agree with Mr. Laidlaw in his views with regard to the carrying out of the show on show days. I question if it is advisable for an agricultural society to appoint a superintendent or manager; I am not prepared to say that it is. The system that we adopt in Strathroy is that we have three or four directors, and they have control of the horses and looking after the stables, and when an exhibitor comes there they find a place for him. Where you have a committee to do that it would be a dangerous thing to have a superintendent. He would come along and want to do something different. He would soon get into hot water. Unless men who are in charge of departments are supreme you are bound to have trouble.

A MEMBER: I was here last year, and when I went back to Bolton they asked me if I made a speech, and I said, "No; there were three or four got up and spoke three or four times," and I think when a man speaks five minutes he should be satisfied, and not speak three or four times. Let us all have something to say. With reference to this matter of appointing a superintendent, I might say that we usually have some trouble in settling up the business of the fair after it is over. What is everybody's business is nobody's business. When you have two or three directors to look after the grounds as soon as the fair is over everybody goes home. I happen to live in Bolton, and they say, "You have nothing to do; you can do that." I think the better way is that a director should be appointed for each department—that is to say, one man to look after the cattle and another to look after the horses, and so on. I think you can get on better in that way. A superintendent, who would be a paid official, to have the complete management of the fair, would solve the problem.

ADDRESS.

BY J. LOCKIE WILSON, SUPERINTENDENT OF AGRICULTURAL SOCIETIES.

It was not with my wish that my name was put down on the programme by the Executive, but on account of the position I hold in the Department, it was thought necessary that I should introduce myself to you. Many of the faces that I see before me are quite familiar, and with many of you in other societies I have been taking an active part in everything pertaining to the interests of the farmers in the past. I may say to you that I did not seek this office. The Government offered it to me, and, after considering some time, I accepted, believing that I could be of some use to the farmers of Ontario, perhaps in a broader way, than I could as a private citizen.

I am glad to be here to-night and to see so many of the stalwart men of this Province, so many of the men who have been working for the best interests of the farmers through their agricultural societies, and who have been endeavoring, through all these years, to educate the farmers and to make their strenuous lives happier, easier, and more remunerative.

You are representing an organization that is not of to-day, nor of yesterday. You represent the oldest agricultural organization that is on record in Canada. Fully 113 years ago the first fair was held in the Province of

Ontario in Old Niagara, but these organizations go away back of that. In 1765, nearly 150 years ago, the first agricultural exhibition was held in Windsor, Nova Scotia.

The work that has been done for the farmers of Canada, and especially for the farmers of Ontario, by such workers as I see before me here to-night, cannot be calculated. Many of you have grown grey in the service, and there are old pioneers here who have been connected with agricultural societies for over half a hundred years. Yours is a laudable work, and you must have been stayers to have held on to the handles of your society's plow through all these years. It is not always best, however, to remain too long in the furrow. While it is necessary to keep a few of the old, trusty, experienced, level-heads on your directorate, I would encourage the idea of having a few young men on your boards. If you never give the boys a chance to show what is in them, what will become of the societies in future years? In order to make your exhibitions the great success they should be, and in order to keep up the interest, you should put a few of your brightest young farmers on your boards each year. It is pretty hard sometimes for the old directors to drop out, but in the interest of agriculture and your societies it is best to get your sons in line, and therefore I would urge upon you the necessity of introducing new blood.

I feel that there is not very much for me to add to what has already been said by the gentlemen who preceded me. I have been connected with agricultural societies in the east for many years, and have been an exhibitor of pure-bred cattle since my boyhood, and in a measure have aided farmers and stockmen in Eastern Ontario in improving their flocks and herds.

There is a great work for us to do. The vista that opens up before the members of agricultural and horticultural societies is a wide one indeed. The secretary and the president, and perhaps one or two of the directors hustle around and do most of the work of your societies, but every member should do his part to further the society's interests.

Agricultural societies of this Province should be made the nucleus of a great co-operative organization. I believe that in co-operation lies the basis of the prosperity of the farmer of the future. A mighty work remains to be done in your agricultural societies for the uplifting of the tillers of the soil.

Under the new Act you are beginning practically a new era in agricultural society work. You are now starting out with a new Minister of Agriculture, new laws, and a new Superintendent. I ask for your generous support and a helping hand. I hope to visit many sections of the Province, and trust we will be able to do something to further the interest of the cause we all have at heart. Working in harmony and all standing shoulder to shoulder, great good and material benefit should accrue to the farmers of Ontario. A few years ago we had but little faith in scientific farming. Many of us looked askance at these "college-bred chaps" who came down to tell us how to farm, but the doubting day is past, the era of scientific farming is here, and Agriculture must go hand in hand with Science in order to make the success we should of our farming operations. It requires as much brain and business acumen to-day to run a farm successfully as it does to make a successful banker. We have our Experimental Farms and Agricultural Colleges to assist in our onward and upward march. We have made arrangements with the Seed Department at Ottawa to send out expert judges to your seed fairs this spring, and we hope every one of you, when you return home, will take up this Spring Fair work. It won't cost very much, and the Department have arranged to give you $25 for a seed fair and a maximum grant of $50 for a stallion and bull show. You can have a combined stallion, bull, and seed show that will enable you to get a total grant of $75. What do these stallion and bull shows mean? They mean that the men who have stallions in your vicinity will come to your stallion show to exhibit their animals. The farmers will come to these fairs and examine the horses and find out which will be best suited for the line of breeding they desire. Farmers who have pure-bred bulls of either beef or dairy breeds can exhibit their animals, and stock breeders will be given an opportunity to see them and select the animal best suited for their purpose, and make purchases.

These are a few of the things we are trying to work up and push forward in the interests of the farmers in the Province.

We prepared a sample programme of seed fairs, copies of which were sent to the secretaries of the societies in the Province. Much good, we hope, will result. Those who have good seed in the vicinity where fairs are held can exhibit and sell their surplus product. Neighbors who want to purchase clean seed will be on hand to buy. You need not offer big prizes; the main thing will be the bringing of buyer and seller together. The price asked per bushel is fixed on the tags, the name of the exhibitor and the number of bushels he has to sell, and the first farmer who decides to buy gets the preference, under the rules of the Seed Fair. You may start in a very small way, and if you have only a few samples of grain and potatoes, your first seed fair will be making the beginning of great things in future. The expert we send you will give you an idea of the best quality of seed suited to your particular soil and climate. If we are content to jog along in the old way and pay no attention to what science is doing for us, we will get behind in the race. If by growing a certain quality of oats you can produce ten to fifteen bushels more to the acre, what will that mean to the Province of Ontario and the Dominion of Canada? Figure it out for yourselves. By doing what scientists tell us, we are going to get a great increase. We have made ourselves believe that the farmers in Ontario were thoroughly up to date, and that we knew all about agriculture, but we must not deceive ourselves. We have much to learn. Our knowledge is yet limited, and your societies are groping after the knowledge that will yet be ours. Immigrants are flocking into this country—the Doukhobor, the Galician, the Swede, the German, and the Dane—and you compare yourselves side by side with them, and know that you are better men in every way; but these are not the best samples of the men of Germany or Belgium or Holland or Denmark. So far as agricultural societies, co-operation and experiment are concerned, these countries are far ahead of Ontario in the science of agriculture. From that frozen land of Siberia, that land of frost and exile, they are sending millions upon millions of bushels of grain into the British market, and competing successfully with you. They are sending in millions of pounds of butter and cheese into the same world's market. Denmark has beaten the world in butter. They did it by co-operation. Twenty years ago Denmark was not in it. To-day she stands at the top. In the Province of Ontario we have done great work by co-operation in our cheese factories, and still further work can be done by co-operation in a great many other lines. In one section of Germany 17,000 farmers have associated together. They have only about five acres of land each, but they have got co-operative steam plows and co-operative steam threshers, and they plow every one of these little farms and do the threshing in the same way.

The members of our agricultural societies and farmers generally must learn to meet oftener than they have done in the past. Once a month would not be too often to meet and talk over things of interest to yourselves and your societies. I think, by the members of the agricultural societies meeting once a month, you will be furthering the interests of your district, as well as your organizations.

I have to thank you for your kind and patient hearing, and I hope to have the pleasure of meeting you frequently in the years to come, and trust that together we can do something to help along the work we have undertaken.

A Member: Would it be possible for two agricultural societies to unite and hold a spring stallion show on the boundary of the two societies, and, if they did so, would they receive a grant for each society?

Mr. Wilson: No; each society will be required to hold its own spring fair.

A Member: You say the Government grant is $50 and the society puts up $50. Is the $50 the society pays considered an expenditure upon which the Government grant will be subsequently paid?

Mr. Wilson: If a society spends $100 on a stallion and bull show the Department grant will be $50. If the society spends $50 on a seed fair, the Government grant will be $25.

A Member: The amount each society puts up is not considered for agricultural purposes. Can we utilize our money for the Seed Fair, and would any necessary expenses in running that fair have to be considered an expenditure for agricultural purposes upon which the society could draw?

Mr. Wilson: Yes; any expenditure at spring fairs, such as advertising, judges, etc., will be counted in figuring up your grant.

THE NEW AGRICULTURAL SOCIETIES' ACT.

By H. B. Cowan, Toronto.

I might state that in the drafting of this Act we did our best to get information from as many sources as possible. We secured copies of the Acts of the different Provinces in Canada, and copies of the ballots of nominations of the different States in the Union, and we even went so far as Australia, and we managed to obtain some very good points from the Australian Act. We have endeavored to embody the best features of those in this Act, but most of this Act has been drafted from our old Agriculture and Arts Act. The framework of this Act is practically the old Act, with some new clauses added.

As some of you have not copies of the Act, I will take it up in detail. In the first place, the old Agriculture and Arts Act has been divided into three, and the new Agricultural Societies are treated separately, and they are given this Act, which is called the Agricultural Societies Act.

I will not touch on the paragraphs that are just taken from the old Act. The first change in the new Act is where a mention is made of the Superintendent and his duties. He is mentioned once or twice through the Act as the Superintendent, meaning the Superintendent of the Agricultural Societies. There is a clause which is re-drafted from the old Act, and which is worth reading.

"The Minister may appoint any person or persons to inspect the books and accounts of any society in the Province receiving Government aid, under or by virtue of this Act, and may empower such person to summon witnesses and enforce the production of documents before him, and to take evidence upon oath in regard to such inspection; and all officers of any such society, whenever required to do so, shall submit the books and accounts thereof to such inspection, and shall truly, to the best of their knowledge, answer all questions put to them in relation thereto, or to the funds of such society."

That, in a way, answers the purpose that I spoke of yesterday in the line of having an auditor, but the clause explains that, only where complaint has been made—if there is reason to be a complaint—that a society's returns are not accurate, then the Department has the power to send a man to conduct such an investigation; that was the purpose of that clause.

The next, "Subject to the provisions of the following sub-section, an Agricultural Society hereafter may be organized in any section of the Province."

"An agricultural society, hereafter shall not be organized within twenty miles of an existing society organized under this Act, or under any former Agriculture and Arts Act, unless the physical, or other natural conditions of the adjoining country, are such that the formation of such society will not injuriously affect the nearest adjoining society."

In Massachusetts they have a condition placing ten miles as the distance; in Australia they have a constitution setting the distance at twenty-five miles. When we came to embody a bigger distance we concluded that it was impracticable, because if a mountain intervenes, there is no reason why some societies cannot be within five miles from each other; so we left a clause by which, under such conditions, they could be organized.

"An application for permission to organize a new society at a specified point—that is, within twenty miles of the headquarters of an existing society—shall be made in writing to the Minister, and shall set forth clearly and fully the facts of the situation, and shall be signed by at least sixty of the persons desirous of forming such society, except in judicial districts or unorganized countries, where the number shall be at least forty. Upon receipt of such application the Minister shall instruct the Superintendent to confer with, and if necessary to call a special meeting of the officers of the existing society whose headquarters are at the point nearest to the point at which it is proposed to form a new society, at which meeting said officers, by resolution, shall place themselves on record as being in favor of or opposed to the granting of said application.

"Should said resolution favor the granting of said application, then the Minister may, through order-in-Council, grant permission for the formation of said society. When opposition is expressed to the granting of said application, the Superintendent shall call upon the interested existing society, and upon the petitioners to appoint one arbitrator each, and said two arbitrators shall appoint a third arbitrator, and these three arbitrators, thus chosen, shall consider the granting of said application, and make a recommendation on same to the Minister."

There are two more provisions made provided they should refuse to appoint an arbitrator.

"A declaration in the form of Schedule A to this Act shall be signed by persons (residing within ten miles of the point designated as the headquarters of the society) desiring to organize a society under this Act. The number of such persons shall be at least sixty."

There is a change there. The old districts had 80 and the Townships 50. and now it is 20 less than the districts. There is a change in the date for the holding of the first meeting, and the annual meeting. Before it read, "The first meeting shall be held on Wednesday," and the change made it the third week of January.

"At the said first meeting there shall be elected a President, a first Vice-President, a second Vice-President, and not more than nine other directors, who shall be duly qualified members of the society." This clause has been added: "Or who must become so within fourteen days after their election, and who, together shall form a Board of Directors."

In some cases there will not be some of the members present at the meeting, and this allows you to elect them then, and their election will stand, if they become members within that time.

"A majority of which board shall reside within ten miles of the place designated as the headquarters of the society. At the said first meeting the society shall appoint two auditors for the ensuing year."

There is a difference there. This requires that the director shall reside within a certain distance of the central point. In the declaration of organization it is specified that societies shall select headquarters, and that shall be the headquarters around which that society works. They are endeavoring to get men in the society who will be able to attend meetings, and so it is required that the majority of the Board shall reside within ten miles. Most of our societies are within five to eight miles of each other, so that clause is not very drastic.

"Societies may appoint not more than six honorary directors, but such directors shall not have the right to vote or take part in meetings of the board of directors."

That is a new clause. Again and again the Department has been asked what power honorary directors have, and had they power to vote? They have no right to do it. It was thought right to embody that clause, and make it clear that honorary directors shall not have power to vote or take part in the meetings.

There is a change in the next clause: "The board of directors, from among themselves, or otherwise, shall appoint a Secretary and a Treasurer, or a Secretary-Treasurer, who shall remain in office during pleasure."

That means that the Secretary-Treasurer does not go up for election each year, though the Board has power to discharge him if they want to. It is found that there is little effort to get rid of a good man, and it was held that this would strengthen his position.

"The Secretary or Secretary-Treasurer, by virtue of his office, shall be a member of each committee appointed, and may be given the power of managing director, acting under the control and with the approval of the Board of Directors."

That clause was taken from the Live Stock Societies Act, which has been enforced there for a number of years, and worked very satisfactory. You do not need to give the Secretary that power, but if you do, it strengthens his power. The next clause is new:—

"The Board of Directors, from among themselves, may appoint an Executive Committee of not more than five members, to whom it may designate such duties as it, by resolution, may specify."

Many societies have been in the habit of appointing an executive committee anyway, and others have not. It is a desirable thing to do, and to draw attention to it, and to give that committee some standing, it was thought well to mention it in the Act.

"A report of the organization meeting, certified by the President, the Secretary, and the Convener, and containing a statement of the number of members and a list of the officers elected and appointed, shall be sent to the Department within one week after the holding of the meeting."

Sometimes a man will get busy in a section, and try to organize a society, and they turn him down in a meeting, and he does not get elected, so the Society, to insure its being kept in touch with the man who does the preliminary work, requires that the report be signed by the convener as well as by the Secretary.

The next clause is changed: "Upon a receipt of such report, the Society so organized shall be deemed an Agricultural Society, within the meaning of this Act, and shall bear the name designated in the declaration as the headquarters of the society, or by such name as may be determined by the members and approved by the Minister."

Now, the great majority of our societies are known by the place where they are holding the fair, although they have this designation.

A Member: In our fairs this last year, we were at a loss for a name for our fair. We act as the Huron Township Agricultural Society, but we hold our fair in Ripley, and they wanted to change it to Ripley Fair on account of it being held in Ripley, but we did not want it changed on account of having this name for over thirty years, and I rise to ask if we did right by leaving that name. Ripley is in Huron.

Mr. Cowan: You are allowed to do that, or take such name as may be determined by the members and approved by the Minister.

Mr. Hamilton: In case we have real estate, and that was conveyed in the name of that district, how would you do that conveyancing if we changed it to the name of some village. We have 22 acres of land, and we change that name, and suppose we have not got our deeds, it is a little mixed to convey that to an incorporated village and divide it from the old Cardwell Agricultural funds. There is where I see the difficulty.

Mr. Cowan: You are not moving the place where the exhibition is held.

A Member: We have our conveyances made to the Electors of the District of Cardwell. That is our deed.

Mr. Cowan: That is more of a legal question, but I imagine that will be covered by the Department when it is changing the names. When you send in and state what is to be the name, some provision will be made by which societies changing their names, and all title deeds referring to the old society, will refer with equal force to the new society.

This is a new clause:—

"For the purpose of this Act, the headquarters of any society organized under any previous Agriculture and Arts Act shall be the place at which the society held its last annual exhibition, or which it has designated by by-law or resolution, at a meeting duly called for the purpose, as its headquarters or place of holding its exhibition, a certified copy of which by-law or resolution shall be forwarded to the Department, and the said Society shall hereafter be designated by the name of the said place, or by such name as may be determined by the members and approved by the Minister."

That is practically what we have been discussing. When we come to the objects of Agricultural Societies, we introduce several new clauses, but the main ones are practically the same as before.

"The object of Agricultural Societies shall be to promote improvement in agriculture, horticulture, arboriculture, domestic industry, manufactures and the useful arts."

Horticultural societies have been taken away from agricultural societies, still there is nothing there to prevent an agricultural society containing these horticultural features, as strong as before, but they must use their own funds.

"By awarding premiums for live stock (other than grade breeding males)."

The societies must take notice of that clause. It was taken from the main Act, but there are a lot of societies doing that, and it is well that should be understood from the first of the year.

"For agricultural or horticultural implements and machinery, for the production of grain and of all kinds of vegetables, plants, flowers, fruits, home manufacturies, and generally for excellence in agricultural or horticultural production or operation, article of manufacture or work of art."

This is a new clause: By organizing plowing matches, holding seed fairs, spring stallion and bull shows, competitions respecting standing crops, and for the best or best managed farms."

It was thought well to put all those in. The society at North Bay had held a farm competing exhibition quite successfully; the society itself, is not a very strong one, but this work has been a benefit. In the Province of Quebec, they give a prize for the best managed farms, and that line has been doing more good than any other line in that Province. The Gold Medal farm is owned by a young man who started fourteen years ago without a cent but now he has a gold medal farm. The Government published illustrations of it, and you can imagine that literature is very much sought after.

A Member: Does that come under the control of the Board of Directors of an Agricultural Society, they having the privilege of selecting judges for aiding these farmers?

Mr. Cowan: Yes, any societies that desire to do anything of the kind, can get very complete rules and regulations from the Deparment in the Province of Quebec. They will show you how.

"By importing or otherwise procuring for the purpose of owning and distributing pure bred registered animals, and seeds and plants of new and valuable kinds."

"By promoting the circulation of agricultural periodicals." In the Horticultural Societies, they are allowed to spend money for horticultural periodicals, the most of them have been doing so. Some Societies in New Ontario would like to have an opportunity of offering papers to the press, but I do no expect that many of the Societies in older Ontario will take that up.

"By offering prizes for essays on questions of scientific inquiry relating to agriculture, horticulture, domestic industries, manufactures and the useful arts."

"By taking action to eradicate poisonous and noxious insects and weeds."

"The annual meetings of the several societies shall be held in the third week of January of each year, at the headquarters of the society, and at the hour of one o'clock in the afternoon. At any such meetings only those who have paid their subscriptions for the ensuing year shall be entitled to vote."

"Societies that expend any of their funds, no matter how derived, for any purpose inconsistent with those herein mentioned, shall forfeit all claim to the legislative grant."

A Member: Will you give us the interpretation of that word "inconsistent?"

Mr. Cowan: I might state, this is where some of the horticultural societies would go and divert funds for other uses. That is a new clause. They would have to do a good deal out of the Act, before that would apply. Horse-racing comes in in that.

A Member: How about vaudeville shows?

Mr. Cowan: The feeling against vaudeville is strong enough; you will see a lot of different things that are defined a little later on.

"At least two weeks previous notice of any such meeting shall be give by advertisement in one or more newspapers published in the municipality or municipalities in which the society is organized, and also by printed placards or bills posted in places of common resort."

This is the way it was before, but this part has been added:—"Or by sending the same by registered letter, mailed to the last known post office address of each member of the society in good standing, such notices to be mailed at least one week previous, and to state time and place of meeting."

A Member: Don't you think it would be better to send out notices to every member of the society in the way of advertising?

Mr. Cowan: This gentleman asks if it would be better if that clause would require that the letter should be registered. The reason for stating that it should be registered is to prevent trouble. A man might get up and say he never got the notice, and especially if there is something to be discussed at that meeting. In all joint stock companies it is required that the letter shall be registered, which receives proof.

A Member: Don't you think the latter part of that clause should be eliminated. The Government in giving money to the agricultural societies, does not give it to the members who have been retained from the premium list of last year. We ought to announce that the annual meeting will take place, and give the people an opportunity to become members, and take part in the discussion, and have a form of this kind distributed. If we take and send a letter mailed or registered, you are only giving notice to the individual. I claim it would be better if that was eliminated, and they take and use the public press by publishing the time of the annual meeting.

Mr. Cowan: It is expected that the societies shall continue to call their meetings just as they have. There are some sections where members are scattered. New Ontario has become of increasing importance all the time, and the members are scattered over considerable area, and don't use the local press.

A Member: Don't you think it would be settled if you said "and" instead of "or."

Mr. Cowan: It is not considered necessary that they should do the second. They could do both if they liked.

Mr. Downey: I will tell you how we overcome that difficulty. It may not amount to very much. When our annual meeting is to take place our Secretary sends a postal card to each member of the society, and in that way, if they want to come they know that the annual meeting will be held that day, and they can come.

The President: That is a very effective way of doing it.

A Member: You should have your annual meeting on a certain day, but you change the Act now, and you can have it on any day of the week and if the directors put up a job on the public, they can send this around with posters, and the public do not know what day it is to be at all; but before we always had it on the third day of the week. On that ground the objection is well taken, because there is no stated day when it will take place.

Mr. Cowan: It says at least two weeks previous. Notice can be given.

A Member: "Or by registered letter." That is the option.

A Member: A society has to have sixty members, and if notice is sent to sixty members, it is being given very general notice.

Mr. Cowan: As the Government says, "Give it a trial."

A Member: The society is to have sixty members at the time of holding their annual meeting; the old Act says only thirty members.

Mr. Cowan: You are in error. The old Act requires that the membership should be fifty, in the case of all township societies, and eighty in all districts.

A Member: That is not at the time of holding their annual meeting?

A.—If they are members then, their membership still goes right through.

Mr. Cowan: They say the membership commences the first of January, you have your full number of members up to the first of January.

A Member: I understand that the members of a society that meet in January are members for the present year, at the end of January they are not members.

Mr. Cowan: The new members start on the day of the annual meeting, but the notices have to go to all the old members. That goes back of this point, "By sending a notice in advance to each member in good standing."

Mr. Evans: Take West Middlesex. Say I had 300 members last year; at the begining of January I only have 85 to 100. Now, on the 1st of January, if I was to take and send by registered mail, I would send to the eighty-five whom I have retained as members on my books. I could not notify the three hundred who have been members for the past year; it would be ridiculous. I would be notifying people there that had no right to come. And the same in the County of Dufferin.

"In case any society shall, through any cause, fail to hold its annual meeting at the time appointed, the Minister, on petition of the president and secretary, may appoint a time for holding the same before the first day of March in the same year, the meeting to be called as for the regular annual meeting, and this meeting in all particulars shall be taken as the annual meeting of the society."

That is to help get returns out sooner.

"In the case of any society being dissolved or ceasing to exist, it can be reorganized only by proceeding under section 7 of this Act, and in accordance with section 6."

We are anticipating as to the result of the change in the Act; some of our societies are going to go out of business, and they go out of business owing to the fact that they have so many societies that will be within twenty miles of the existing societies, and to prevent them starting up again within too close a distance this section was put in there.

A Member: What becomes of their property when they go out of business?

In reply to your question: "Upon being notified or becoming aware of the dissolution of any society under the provisions of the preceding subsection, the Minister may order the directors to deliver over to the Department the assets, if any, remaining after all just debts have been paid." I believe it is touched on still further on; that covers it.

A Member: You give a society a grant, and they spend all the money you give for the purpose you give. They try to get a little property through their own expense, and then you make an Act to put them out of existence. How can you do that?

Mr. Cowan: That is one of the clauses that is taken from the old Act; that is not a new clause. We are not expecting you to put it in force. Most places where they are put out of business they have assets on their own side.

A Member: In cases of societies saying that they cannot carry out the provisions of the Act, cannot they amalgamate with the horticultural society and still retain the money in that district?

Mr. Cowan: There is no provision in the Act to enable them to do it.

A Member: Supposing we do not come up to the requirements; supposing we spend money that is inconsistent with the Act, the grant is withdrawn; but that society is out of existence because it does something that is inconsistent with the Act.

Mr. Cowan: You simply lose your grant for that year; you can go on again.

A Member: What position does it place an agricultural society in that has good grounds, $20,000 or $30,000 worth, and they do something inconsistent with the Act—give a prize for a horse race?

Mr. Cowan: That is a good point, and I would have to consult with the Minister before I give you an answer to that. It did not occur to me in that way, and I do not think it occurred to the Minister. A society that breaks a law for one year loses its grant for the year. I will try and get the answer to that question before you leave to-night.

"The said reports shall, if approved by the meeting, be placed on permanent record in the books of the society, and shall also be sent within one month to the Department, and the Minister may require all such reports to be made out on schedules to be supplied by the Department in such forms as he may direct."

Mr. Cowan: This year the forms that have been sent to the societies have been the same as in the past, because the standards were under the old Act, and after this year complete new forms will have to be issued. We will go more into details of expenditure. There has been added to this clause:

"Failure to comply with these requirements shall be sufficient to forfeit all claim, on the part of the society, to participation in legislative grant."

That has been put in there to insure their making good the return fund.

R. J. Sproule: Would it not be advisable to get out these new forms for the benefit of agricultural societies, in order that they may conduct their books so that they will be complying with the orders of the new form? The books are kept the whole year, and perhaps they are not in compliance with the new returns at all.

Mr. Cowan: There are some clauses that are taken from the union societies. They refer to societies established in New Ontario. Special arrangements are made for them, and they do not come under what is known as "New Societies."

"On or before the first day of March of each year the officers of every society shall send to the Department an affidavit, sworn to before any Justice of the Peace, in the form of Schedule B, annexed to this Act, stating on forms to be provided by the Department, the exact financial transactions of the Society during the previous years."

You will notice that says the first day of March. For a long time it was the first day of September; then it was moved to August, with the object of having the returns made at that time of the year; and so, to show the society was a good worker before paying the Government grant, the Department want some assurance that you have all the members and are right up to the mark; but it has been moved forward to the first day of March, so as to enable societies to get their grant earlier than they have in the past.

"This statement shall set forth plainly the number of members in good standing that belong to the society. This statement shall also give the amount of money that was paid in prizes for horses, cattle, sheep, swine, poultry, articles of domestic manufacture, other products of the farm, orchard and garden, and that were expended for such other purposes as are set forth in section 9 of this Act."

"If a spring stallion show, a spring show, or a combined spring stallion and bull show has been held, or a spring seed fair, such statement shall be set forth separately, and shall show plainly the number of entries, and the amounts expended in prizes. Such moneys shall be considered as having been expended for agricultural purposes."

A MEMBER: Will the annual statement not cover that purpose?

Mr. COWAN: It is possible it will. It is also possible, in preparing these new statements, the secretaries will have to go into more detail than was done at the time of the annual meeting.

Mr. REEKIE: In that declaration that is made on the first of March, the secretary and treasurer is to make an affidavit as to the number of members?

A.—The members are mostly down at the time; practically speaking, at that time the members are those that keep back a dollar from the last year's exhibition. We are taking an affidavit at that time of a less number of members than earlier in the year. That is a point that I would like to bring before you.

Mr. WILSON: Do you know if the Department insisted on a society having sixty members from the first of the year?

The CHAIRMAN: Under the laws the returns are supposed to be made by the first of March. An affidavit is sent out, and you are supposed to state how many members you have in this present year on that affidavit. I cannot exactly state whether the Department will insist upon your having enough members to comply with the Act or not on the first of March. The idea of the new Act, I presume, was to let the Department understand that your agricultural society was a going concern under the law; that you were an organized and a going institution.

Mr. WILSON: The point is this: You want to know how much you are to get; you want to know how much the grants are. If we do not get that return earlier, we cannot tell you what the grants are to be. The sooner you get the affidavit made the sooner we will tell you how much you are to get.

The PRESIDENT: He asked about the obtaining of members from last year; would they count?

Mr. COWAN: Yes.

A MEMBER: We did not keep a dollar back to make a person a member, and we know we are keeping members until there is some inducement of a show. If we keep a dollar back and let the old members stay, we would have a large membership.

Mr. COWAN: The societies will not be unreasonably hampered this year.

W. A. FRY: I think the Dunnville Fair has adopted that. At our annual meeting we distributed blank notes among the directors, and they started a convention there that day. To-day we have 200 members of the Dunnville Fair. I will take my affidavit on sixty members.

Mr. REEKIE: If the returns are for the last year, why shouldn't we check the books? If we have a member for last year, probably we will have him again. All you have to do is to say the society is in a running condition on the first of March, giving the society no time to get in a requisite number of members. He may have to make an affidavit if he has only twenty members.

A MEMBER: I guarantee that 20 per cent. of the delegates here are not carrying on under that Act, because you have to wait until the exhibition. The people won't pay the dollar unless they have something to exhibit and get it back. They did splendid work the year before. I say that should be taken into consideration. It is not the amount of membership you have—it is the amount of good work done in the agricultural community that should be the basis.

MR. COWAN: We had many suggestions made as to how the money should be distributed. One was that we should distribute in proportion to the membership; then we were to distribute two-thirds of it in proportion to the amount expended and the amount of membership, and one-third on agriculture; but we found after that was done the tendency was to drive societies into the cities, so we threw out that membership idea, and made the basis on agricultural expenditure which will best benefit the people of the section were they are organized. The best way to insure interest is to get persons identified with the society, so we must have some standard, and they should have some standard by the first of March.

The PRESIDENT: I think, as Mr. Cowan said, the Government will not be arbitrary on that point. I think some allowance will be made on this point.

"An amount not exceeding $70,000 shall be subject to division among the societies of the Province on the following basis."

MR. COWAN: The amount distributed before was $76,000, but $6,000 is going to the horticultural societies. It is expected that some societies will drop out, and the money will go among those that remain, so it is possible that there will be a large amount granted.

"Societies that have owned and maintained pure-bred stock, for the benefit of their members, for the period of at least nine months during the preceding year, shall receive a grant of $50 for every registered stallion, $20 for every registered bull, $10 for every registered boar, and $5 for every registered ram so owned, and the special membership grant of one dollar for every member of the society in good standing up to fifty."

As I reported once at a previous meeting, the societies in Nova Scotia and Quebec go in for that line very extensively. We do not need it so much in New Ontario. We have societies which have owned thirteen and fourteen animals, and we have societies owning no more than one or two, so they received their money in proportion to the amount they have.

A MEMBER: We have been distributing pure-bred stock, and it has done a grand work for the farmers, and I want to say that the members of our society are unanimous in the opinion that the new Act is a great benefit over the old one.

A MEMBER: Can a society dispense money for pure-bred stock, and where they sell them to the members? That is the way we always do. We sell to the members, even if we lose money on it. Or do they have to be held in the society?

MR. COWAN: That would be covered in the form you report on. You would be required to show that the members who procure those animals retain them for nine months, and they were for the benefit of the society.

"Societies that hold a spring stallion show, a spring bull show, or a compound spring stallion and bull show, shall receive a grant equal to one-half the sum expended in the holding of such show, but such sum shall not exceed fifty dollars."

The point was raised whether the sum spent was $50 or $25.

"Societies that hold a spring seed fair shall receive a grant equal to one-half the sum expended in the holding of such fair, such sum not to exceed twenty-five dollars."

That would have been a little clearer if we said such a grant shall not exceed $25, because that is what is intended. If the society holds a seed fair and expends $50, the Government will spend $25, and the same with the stallion show.

A MEMBER: When would that grant be paid to the societies—at the end of the year or when the report was sent in?

A.—My impression would be at the end of the year. Many societies hold only one fair in the fall. This clause is put in to encourage the shows along other lines.

"Newly organized societies, the first three years of their existence, shall receive a grant each year equal to one dollar per member up to 600 members, except in the case of societies organized in judicial districts and unorganized countries, where the grant shall be equal to two dollars per member."

That is with the idea of getting people interested. To start with getting a lot of members, and then you settle down after you have run the required period.

A MEMBER: Don't you think that the idea would strike some people that these organized societies that are going out of business would organize the new societies, and get twice as much grant as one would get under the present condition. The point is this: There are two small societies and three smaller societies, and the contention is that they go out of business in rural districts.

MR. COWAN: Not necessarily, because a greater number of these societies are going to come up—they are going to be helped.

A MEMBER: That is not the way it reads. It reads that they are going out of business, and there is the temptation to go out of business and organize again under a new system.

MR. COWAN: For two societies that would result to the benefit of the section, and it might be done for a while; but the societies will have to go out of business because there are few sections where there is not a society within twenty miles, and they have to consult them.

A MEMBER: They will tear this to pieces so much that there won't be much left of it inside of five years. The temptation is very strong, and two townships or towns can go out of business and get their six hundred dollars. According to the Act they have to get it.

MR. GRAHAM: I asked about the distribution of this money, based on these special prizes in a district where we are not down, and the agricultural societies in the towns and cities are?

MR. COWAN: That is right. That is why we would not put in the membership business.

A MEMBER: For this reason: You can go in a town and get special prizes up to $1,000, and you cannot do that in the country. In cases where you have a plow or a harrow for a prize, is that added in the basis of distribution?

MR. COWAN: I thought that point would be asked when I was back further. That is an important point, and one of the questions is: If a man gives a special prize, will it be counted in as special prizes? Unless the special prize is given in cash, and given to the directors with the authority to spend as they liked, it cannot be considered as one of the expenditures of the society.

A Member: If they take a special prize and apply it to one of our advertised prizes in the list?

Mr. Cowan: You cannot, if they take it in cash and appropriate it in cash. Someone gives a calf which is offered as a prize, and someone wants to know what it is worth, and the Department said, "No; you cannot do that." The minute that was done there would be a series of frauds, and then again we don't want to see the societies driven into the cities and towns.

Mr. Evans: Suppose that I offer $5 in cash for the best ten pounds of butter, isn't that just as good money in the aid of the agricultural industry just as much as if it comes from the Government, and why doesn't it count?

Mr. Cowan: If you give $5 for a prize it would have to go through the hands of the directors.

Mr. Evans: Suppose a gentleman from Strathroy offers a Daisy churn, and it is put down to its actual value, and this is given for the best ten gallons of maple syrup, why should not it count as much as if it was actual money?

Mr. Cowan: You can argue that for a long time.

Mr. Evans: I don't believe in any fictitious values.

Mr. Cowan: There is a line that has to be drawn, and the Government drew that line. If you give Daisy churns you can give any kind of merchantable article, and to draw it at the easiest line we drew it at cash. It affects all societies equally.

A Member: If we give three dollars for a sheep as a prize, and a man gives a Daisy churn, and the man gets the prize, his prize is valued at three dollars, and he gets a Daisy churn, but the society gets the three dollars.

Mr. Cowan: It is questionable if it would be allowed.

A Member: I think that matter can be overcome by each individual society taking hold of it. We took prizes from all merchants, but two years ago I went to each one personally, and I said: "Here, that doesn't do us a bit of good. Cut that all out and give us cash; and there wasn't a solitary one that didn't do it and give more than twice as much in cash as they ever did in merchandise, and I got $400 last year.

Mr. Reekie: That is the way societies are making returns. A man sometimes gives $5, expecting the butter would become his property and perhaps he really gives no more than one dollar.

Mr. Cowan: Such things as that would not be counted.

Mr. Gould: We have a merchant in the city who gives us three dollars for a prize for one pound of butter; now we have twenty-five entries for that one pound of butter, and the butter becomes his property; will that count to encourage the butter-makers? We have in our fair from $75 to $100 given as a special prize for butter. Isn't that an inducement for wives to make better butter. Whatever is given to encourage the women on the farm should count.

The Chairman: Do you think, after all, it will make much difference to the societies? Here is $70,000 to be divided, every society receiving an equal amount for prizes; it makes no difference whether you divide the total amount on the basis of $150 less; it will bring the amount you receive about the same, I think. Mr. Cowan's ruling is all right. As I said, some changes may be made to the Act afterwards, but I don't think it will make any difference to the distributing of the grant if you count the goods or rule them out; and, as he said, they had to draw the line some place, and they drew it at cash.

Mr. SMITH: In the interpretation of the Act, I would like to know regarding the building matter, because there are many societies that are trying to put up better buildings, and they are all going to increase on that line?

Mr. COWAN: That was left out of the Act when it was first drafted.

Mr. SMITH: It is an excessive hardship for many of the societies that are putting up buildings and are making expenditures beyond their means.

Mr. COWAN: I feel that our societies are going to get stronger, and the need for buildings is going to be stronger, and last year more money was spent in buildings than ever before.

Mr. O'REILLY: I would call attention to a matter which was brought up last year in the case of private individuals—a curling club—who would assist in putting up the building. We had offers to assist us in doing so, and I asked Mr. Cowan the question, and he told me he would give me an answer if I wrote and gave more particulars on the matter. I did so, and I got a reply stating that the matter was laid before the Government and later on we would get a decision. As far as I can see we have no decision. The Act gives them no power to aid us. I called Mr. Wilson's attention to that, and asked him to draw the attention of the Government to it.

Mr. HOARE: I am a resident of West Durham. I may say that we have found that our grounds are too small, and we contemplate renewing the grounds, and consequently this matter of building will come up particularly, and I am glad we possibly will have some motion in connection with that.

Mr. R. J. WATSON: Speaking of the grounds and buildings, we have bought grounds of the amount of $1,000 this fall, and we expended a good deal of our surplus about $800 on these grounds. I think the money expended in that way should be spent on agricultural purposes. We have a large hall in connection with the buildings, and up to the present time we rented the grounds and owned the hall; now we own the grounds. We bought it, and we have the money spent in that way for agricultural purposes.

Mr. GRAHAM: I purpose making a resolution on that. I want to know whether the officers of the Executive Committee are to wait on the Government for the purpose of introducing a resolution asking the Government to count the expenditures in grounds and buildings.

Mr. WILSON: There is just one point that might be considered: One gentleman spoke about the danger of fairs being forced into our towns. I would say in this connection that a great many of these towns have got pretty expensive agricultural grounds. If there are a great number of societies that have grounds running from $7,000 to $8,000 apiece where would the $70,000 go to? Where would you get the money to pay for prizes? You would have to go to the Government and say, instead of making that $70,000 grant make it $270,000. You say it is a hardship. It is a hardship to those that put their money into buildings and grounds. It must be noticed that we are limited by the Legislature to the sum of $70,000. If there are any large number of societies running from $2,000 to $5,000 each, they would gobble up the $70,000 pretty quickly. It might encourage societies to put up buildings beyond their means.

Mr. BOUGHNER: I am hardly in accord with many of the changes that have been made. It struck me that right here is a weak point in the new Act. I have felt from the first that there should be some provision made for those societies that have spent thousands of dollars in their buildings and grounds. In the past there are societies that had the money, but had no local habitation. They went around from one part of the country to the other. They hadn't a dollar invested where others have $15,000 invested. I feel that some provision should be made in the division of the grant in favor of those societies, and in helping those that want to improve their grounds. Mr. Wilson says we have $70,000, and that much cannot be done to support a change of that kind. We will be satisfied if they will give us a small part out of that grant. There are societies with $15,000 invested, and there are others down to $1,000. I am willing to leave it to the wisdom of the Minister of Agriculture to work out a scheme by which something in the way of a percentage could be paid to the societies in that way; but we do feel that something should be done to help those societies that have invested. With that now, you as a Government and we as a society, wish to see the grounds of the societies improved throughout the Province. You cannot go on and hold successful shows without having good buildings. I do not think there is any better way in which they can spend a small part of that $70,000 than as a remuneration for our expenditure in that way.

Mr. Cowan: I think that will come up with the resolution. This is the way I look at it: The total expenditure of our agricultural societies comes to $500,000. I do not anticipate that the total expense for agriculture exceeds $50,000. Shall the Government in the future distribute the funds to the societies on the basis of the $500,000, or shall they include the $50,000, and distribute, giving to the societies who have improved their grounds? I think that if any demand was made to touch the $70,000 to pay societies on the buildings they put up, it would be a serious mistake. But while societies might not have put up buildings, they have been expending their money in prizes, which is equally good, and I do not see where there would be any injustice in arranging that in the future let them have credit for any money they put on buildings, and they can get credit for it; but I say—I am speaking personally on this—it becomes evident that where we are considering this Act that more care would have to be taken to prevent fraudulent returns, so as to enable societies to get larger returns than they ought. That is why the Government should send a man to inspect the books of any society.

"Should it be found, within one year after the receipt by the Department of a society's annual statement, that an officer or officers of the society had wilfully made false returns, with an intention to deceive, such officer or officers shall be liable, upon summary conviction before a justice of the peace, to a fine not exceeding $100, or imprisonment in the common gaol of the county for a period not exceeding thirty days."

Mr. Cowan: That is the safeguard, and I anticipate that the Government will publish the returns of all societies in connection with the annual report in future, so that all the societies in that section will have knowledge of what they expend.

Mr. Glendinning: In case the society has no grounds, and they pay rent for grounds, is it legal to enter that in the expenditures?

Mr. Cowan: It would not be as the Act stands now.

Mr. Glendinning: We have been doing that for years.

Mr. Cowan: That would not count at present. The next change is a change of place of holding the exhibition. That is practically the same as before. It is specified as headquarters. If you are going to change the headquarters you must have a vote on it. Stipulations regarding the games of chance have been made more stringent than before. There is a reason for this. We find that these games of chance are gaining in Ontario with astonishing rapidity, and when it came to the drafting of this class we made it more stringent and specific than before.

"In case any person is convicted under this section, the society thus proven to have permitted horse racing shall be debarred from receiving any portion of the Legislative grant in the next ensuing year."

"The officers of any such society may by their rules and regulations prohibit and prevent all kinds of theatrical, circus or acrobatic performances, exhibitions or shows, and may also regulate or prevent the huckstering or trafficking in fruit, goods, wares, or merchandise on the exhibition grounds, or within 300 yards thereof; and any person who, after due notice of such rules and regulations, violates the same, shall be liable to be removed by the officers, policemen, or constables of said society, and to be subject to the penalty prescribed by the next preceding section."

A MEMBER: The detectives have gone out to the grounds and have seen five or six games of chance standing there, and simply because the men were not operating them they could not arrest them—that is, on the grounds in Ontario, and with the consent of the directors.

MR. COWAN: We have some societies represented at this meeting who have allowed these things.

"It shall not be lawful to sell or to have for sale on any exhibition ground during the time of holding an exhibition any wine, beer or spirituous liquors, and any society permitting the same shall forfeit all claim to any grant during the next ensuing year."

We have got several cases during a couple of years of societies allowing liquor to be sold on the grounds. Heretofore that has been covered, in part, in the license law; but there was nothing to cancel the society's grant, so it was put in here to be more specific, and that is put in that they shall lose their grant.

A MEMBER: If it is brought there and given away, how will that do? Does that Act cover that?

A.—That would not be allowed under the license law. The license law covers that. The license law is very strict in distributing liquor in public places. I am satisfied that it covers that point.

A MEMBER: Will you define what a violation of that law will be? In our fair at Ingersoll we found on the afternoon during the last day of the fair that there was liquor being sold on the grounds. Supposing we did not run across that at all, and some person came in, an inspector, and found that being carried on unknown to us, I would like to have your opinion to know what position we would be in.

A.—I am afraid you would be in trouble. The law requires that the directors shall assure themselves of all that is going on on the grounds.

MR. COWAN: The next clause is about destroying the games of chance. Then there is the clause as to the personal responsibility of the officers. It provides: "Where the officers of a society neglect to obtain proper security they shall become personally responsible for all funds of the society in the possession of the treasurer."

A MEMBER: Section 36 provides that the municipal council of any city or town may grant land in aid of any agricultural societies. We found fault with that word "may." I think it should be "shall." We understand by a by-law of that kind that it has got to be submitted to the people.

MR. COWAN: The Government considers that a purely local matter. You can depend on the city council complying. We understand that a by-law as created has to be submitted to the council under the Municipal Act and it has got to be submitted to the people. Why should not the council be allowed to submit that by-law? The Government considers that a purely local matter, the Government doesn't want to say they shall do it in a case of that kind.

The President: In connection with a question raised that one delegate should have two votes, I do not believe in the principle. It was carried as a motion last year, but the motion did not provide for the amendment of the constitution. It reads that "every society shall send two delegates." That is the provision of the constitution.

A Member: I may say that I came here a representative of the township of Kent two years ago. We were late in arriving, and we were not in time for the revision of the constitution. At that meeting I gave notice that I would bring up the resolution that you read, that where societies wish to send one delegate representing them they can have the power to do so. In societies situated at great distances from Toronto it draws heavily on their funds to have two representatives come, and we felt if you had one member and have an extra proxy, that would make it much cheaper for our societies, and place all societies on an equal basis as far as representation is concerned.

A vote was taken, when the President said:

That is an equal vote. I think the constitution must guide us in this. I would ask the secretary to call out the names of the societies and two delegates who are present who will be entitled to one ballot each.

AUDITORS' REPORT.

Mr. **Hudspeth** presented the report of the Auditors of the Secretary-Treasurer's financial statement: "We find a balance on hand from 1906 of $10.21, and a balance on hand at the present time of $51. We have examined the report and vouchers thereof, and find them all correct." The report was received and adopted.

GOVERNMENT ASSISTANCE FOR DELEGATES.

Mr. O. J. **Wilcox**: I have come 200 miles as a delegate. There are six delegates here from the county from which I come, and I believe it costs the societies $100 to send these delegates to this convention. I have a motion to make which reads as follows: "Resolved, that this Association of Fairs and Exhibitions assembled memorialize the Government of the Province of Ontario to extend to the delegates attending these conventions the same requisitions that have been extended to the delegates attending the Farmers' Institute convention held yearly on the grounds of the Industrial Exhibition, Toronto, and that a copy be sent to the Government."

I was a delegate to the Toronto Industrial Exhibition, and to that convention the arrangement was made that all delegates coming from a distance do not have more than $2 of their train fare to pay. The Department paid all railway expenses which exceeded $2, which left it for the delegates uniformly over the Province, so far as expenses are concerned. I do not see why that arrangement cannot be extended to this convention. This is just as important a convention as the Institute convention. The Province of

Ontario has deemed it wise to set apart $70,000 of the funds of the Department of Agriculture to assist the Agricultural Societies, while they have only given $10,000 to assist the Institute, so they must think we are carrying on a more important work than is carried on by the Institute; and therefore I do not see why it would not be wise to extend that railway fare provision to the delegates here.

The motion was seconded by Mr. John Paget.

Mr. COWAN: I might say there is no harm in that, but I do not believe the Government would pay any attention to it. The Ontario Horticultural society met in convention, and they passed that resolution, and they appointed a deputation to wait on the Government. They have not very much funds, and the Government took the stand that if that step was taken there was no knowing where it would end. The Bee-keepers and every organization would be wanting the same. The Government turned down the resolution of the Horticultural Society, and I am inclined to think they would turn it down here. It is unfortunate that some societies are so located that the delegates have to pay more than others.

After considerable discussion the motion was carried.

ATTRACTIONS AT FAIRS.

By H. B. COWAN, TORONTO.

As you remember, a year ago our Association passed a resolution asking the Government to take off all restrictions on horse-racing. I approach this question with some diffidence. It is a question that has been discussed here for a number of years, and we have never come to any decided opinion; we have still been divided for and against. I am inclined to think that the reason we have never been able to decide has been because we have not realized what a big question it is, and how much has been involved in it. My own opinion has been changed several times on it since I became Superintendent. At first I was opposed to it, but when I became Superintendent I found many societies were succeeding because they had it; they could not succeed without it, and then my opposition disappeared. Then, in going into the thing more thoroughly than I had, I realized that it was a question we had to consider as to how it affected the societies in the Province, and how is it likely to affect them in the future. I am not going to attempt to convince any of you that horse-racing should or should not be carried on, but I want to show you what influences affected the decision of the Government in dealing with your resolution, and led it to re-introduce that clause in the Act. To do that I have to touch on the subject of Agricultural Societies, as they were when they were first organized in Canada. The first one was organized about 110 years ago. Some societies were organized in the States before that. At that time, the States and Canada were practically nothing but agricultural countries. The societies that were established in Canada worked for years without any Government grant. They had pure-bred stock. They had agricultural libraries, they had plowing matches, and altogether they were purely agricultural. They increased in numbers year after year, until in 1835 there were so many of them that the Government felt justified in helping them on with a grant, and that was the beginning of the Agriculture and Arts Act in 1835. In that time horse-races, as we know the term to-day, and vaudeville shows were not known. Since then there has been a great change in the character of the shows called the Agricultural exhibitions. The change was noticeable first in the States. As the cities increased in numbers and size there was a tendency to take the societies to the cities and hold their exhibitions there with the object of drawing out the city people. They put on special features that had not been identified with the Agricultural societies before in Canada, I presume. The first change started at the exhibition held here in Toronto. I believe Toronto was the first centre to take up an exhibition and conduct it on modern lines. To make a success of these exhibitions in the city, it was considered necessary, and has been necessary with them, to put on special attractions, something that would appeal to the city people more than a purely Agricultural exhibition, and this is what was done in Toronto. It succeeded in Toronto, and soon other shows followed, and adopted those features and gradually the character of our exhibitions changed. I do not think we have fully understood this question, and while we have been adopting it in the past, one man is conducting his exhibition in the way he believes to be the best for his society, and another man gives the experience of what he considers has been a success at their exhibition. and they have not realized that the experiences under which they were working were altogether different. I would like to draw your attention to something in connection with our societies. Here is the map of the Province of Ontario. We have at Toronto, the Toronto Industrial Exhibition. We have only one exhibition in the Province, or in Canada, like the Toronto exhibition. It is bigger than anything else, and I hardly need to say that you will all agree that it would be impossible to try and hold another fair on the same plan as Toronto. We will drop from Toronto exhibition to the smaller places—to the Ottawa exhibition, and then London. Each of these appeals to another section of the country. A great many people go to Toronto that attend both these, but a great many attend these that do not go to Toronto. Just outside of all these fairs we find one or two conducted on much the same lines, and much the same features, bigger than our country fairs. Then in eastern Ontario we have the Brockville fair and then we get nearer Toronto, and we take in the Lindsay fair, and we take in Aylmer or north of Toronto, Collingwood. Each one of these fairs that I have mentioned are about the same in size and conducted on the same lines. They have made a success of those same kind of features that have been successful at Toronto. When men representing those fairs get up at a convention and give their experiences and say it is impossible to hold an exhibition without these features they are telling the truth as far as they are concerned, and I sometimes think at those conventions that we have heard too much from the men representing those societies, and have lost sight of the little country exhibition, which most of you represent, and which are run on a much smaller scale. At Brockville, Aylmer, and some of these other places they find that it would be absolutely impossible to conduct their exhibitions without those features. They are able to prove that they have increased their prizes by having the horse-races, and I expect they are neccessary; and I think we will all get along a little faster if we drop personalities, and take a man's word as his pure opinion.

Many other smaller cities, not realizing the position they were in, have tried to hold fairs on the same lines as Aylmer, for instance, and so they have failed. The experience has been in nearly all these cities, with the exception of a few. that they failed. I can give you the name of city after city that has tried to hold fairs. and they have gone under.

Now comes the point: Why should they fail in a city? In the first place. I think the farmers want to go out to visit each other and swap experiences, and have a nice day of it. When they get in to the city they say, "We must have money to run this thing," and they put on special attractions, and then to run that they slip on a few city directors, and gradually the farmers begin to go back into the background.

Then there comes a rainy day, the attractions are bad and the attendance is bad, the farmers are in, and then comes your blow. The farmers begin to get disgusted, and drop away from the exhibition, and that is why it has been impossible to run exhibitions on purely agricultural lines in the cities. If horse-racing, as introduced at our exhibitions, has always been beneficial and always helped to build them up, I am inclined to think there would not be the same objections taken to it as to-day; but unfortunately experience has shown that while it has helped, it has hindered as much as it has benefited. There are are many men who are in favor of horse-racing on a limited scale, but they do not want the hobbled up horse, as the Hon. Mr. Monteith said last night. They say, let us have a little trotting; our fairs need it. This is just another one of the questions where a line has got to be drawn somewhere. But where are you going to draw that line for the benefit of everybody? In this case the Government has drawn a line that there shall not be any horse-racing; you can have a trial of speed. Some people say let us have the farmers' race, this is what follows invariably. A common little horse trot is all right for the first year or two, and then they develop two pretty good horses, and the next cry is, we want to lick those horses in the other county; and the crowd gets tired of that and they want something a little bit more, and the element that is there has grown stronger.

You put up a prize list, and in six or seven years the doors open, and you are right into horse-racing. That is why I say there has to be a line drawn somewhere, and I think it right to draw the line there at the races themselves. Here is another effect: When you start along racing, a gradual change begins to come over your societies, in most cases, not always. The men, who are interested in horses, develop fast horses, and they begin to shove on the door, they want to have a say in what the fairs should be, and gradually the farmers drop off.

There are a great many people who do not like a horse-race, and they stay in the background. The crowd that attend your exhibition changes, and another element is getting in there, and in time you find a different crowd is attending your exhibitions, and a different board of directors are in charge of it, and gradually that will affect the whole section. Here is where we have to ask ourselves, where does this thing end? I would like to bring you back to the States one hundred years ago, when they were in the same position that we are in. They started as purely agricultural exhibitions. Although it is repeating, I would like to show you what happened in the States. Canada is away ahead of the States in a great many things, because we have been able to profit by their example. I think it is important that we should profit by their example. A year ago the Government sent me to the States to find out what were the conditions there.

A MEMBER: I would like to ask Mr. Cowan a question. Is he here representing the Government or for whom is he speaking—for this convention or for the Government? It seems to me that a man coming here can educate the Government better than he can educate us along these lines, and it seems a pity that we have come here year after year, and the first half of the convention was taken up by a long report from our Superintendent. I say if we must have that report, cannot it be printed and sent to the Secretaries previous to these meetings so that we could come here and be prepared to discuss it. I would like to know if we haven't men here that have a little more knowledge of horse-racing at fairs than our Superintendent can possibly have.

The President: Mr. Cowan was put on the programme as the former Superintendent of Agricultural Societies, to deliver an address to this Association upon the new Act. It was passed last year, and this is the first meeting the association has had since the new Act was passed, and it was thought that he was the most qualified man to discuss this matter with the delegates of this association. He has been invited, and he is now continuing his address which he started this morning upon the new Act.

Mr. Cowan: I might state that your resolution was not valid. You want to know the reason. I am trying to tell you, and show you what things were taken into consideration when your resolution was turned down. I have to go pretty thoroughly into it. We have to find out what has happened where they allowed horse-racing to go to any extent.

In Maine they gave, in 1904, $700 more for horse racing than for all agricultural purposes put together. In Massachusetts it has been shown that there has been a great decline in agricultural societies. Now taking matters in Ottawa, for horse-racing $19,876, for special attractions $10,000, and for agricultural purposes a little over $19,000, or they give 50 per cent. more for special attractions and horse-racing, than for all agricultural purposes put together. Those are so-called Agricultural societies.

In Ohio there are 69 societies drawing Government grants. They give $105,000.14 for all agricultural purposes, including fine arts and so on, and $103,000 for horse-racing alone, and with the horse-racing come those games of chance.

In Ohio, with their 69 country fairs, there are receipts from side shows of $60,765, or the average receipts at their fairs for side shows were $880. That will give you some idea of the extent to which those things have got in among the fairs on the other side. You may say we will not get those things here in Ontario, and if we had any opportunity to see those things there would not be the same diffidence in handling this subject.

During the past twenty years conditions have been changing rapidly, and we find that the fairs that have gone into this to a large extent are those that run along the borders where they are in touch with the conditions in the States. You will find in this section a larger proportion of the fairs going more into these shows. These conditions have been changed within the past twenty years. You have seen the reports we have already from the societies in our own Province which are giving more for horse-racing and special attractions than there are for all agricultural purposes put together. They have sprung to the front during the past few years, and we do not know how rapidly the proportion is going to increase. I do not want to go into the argument for and against horse-racing; we have heard this often enough.

The Hon. Mr. Monteith made clear that the motions that have passed do not mean to prevent trials of speed of a horse. A definition of that law as prepared by the Minister is as follows:

"As the Department continues to receive applications from the officers of the agricultural societies for an interpretation of Section 29, of the Agriculture and Arts Act, and of Section 22 of the new Act governing agricultural societies, which will come into force next year, and for a definition of 'Trials of Speed' as distinct from 'Horse-Racing,' the following definition has been approved by the Hon. Mr. Monteith, and is given the officers and directors of agricultural societies for their guidance.

"'Trials of Speed' shall mean competitions among driving horses in which conformation, soundness, and style are considered as well as speed in the winning of the prize. If, in the judgment of the officers or judges it is deemed advisable to test the speed of the contesting horses, it is allowable to do so, but the prize must in every case be awarded on general excellence as seen in the above characteristics. It is not intended that purses shall be offered made up of deposits of entry fees from owners of contesting horses, but that premiums shall be offered in the usual way. 'Horse-Racing' shall include competitions in which all or any of the following conditions are followed:—

A.—In which speed only shall be considered.

B.—In which entries are restricted by time limits.

C.—In which all restrictions are made as to the number of entries."

A MEMBER: Is that the Minister of Agriculture's decision?

Mr. COWAN: Yes, and it stands.

A MEMBER: There is no use discussing it, therefore, if that is the opinion, and it stands; any resolution that this society could pass, contrary to that, will not pass.

Mr. COWAN: If you are satisfied, I am.

Mr. EVANS: We have the Provincial Association in connection with our Agricultural Societies. Surely the Minister of Agriculture is going to listen to a certain extent to the wishes of the men assembled here for purposes of putting their positions before him. If he is going to take a position here, I do not take that view and I believe if we place the thing in the proper way before him even though he does not consider it he will respect us.

Mr. COWAN: I have authority to tell you what influences were at work and what things changed the decision in regard to horse-racing.

Mr. GOULD: Should that stand?

A.—It stands to-day.

Mr. COWAN: It has been claimed that it is impossible to hold a successful agricultural exhibition without a certain amount of horse-racing. To see if that was the case, I sent out, last November, a circular to all the societies in the Province, and I asked some questions. The first one was "Did your society hold any horse racing?" The replies show that 170 different societies do not hold horse-racing and that 105 societies do hold horse-racing. Those are the ones we heard from, and the total was 275.

Mr. GOULD: How many would there be that you did not hear from?

A.—One hundred that we did not hear from; a lot of them would be Union societies where they do not hold any fairs. The total amount offered in prizes was $22,900, and the total amount in 1900 for entry fees was $6,333, and gives the society $815; or the average amount paid out for horse-racing by 105 societies was $133. We asked some other questions. "Do you consider horse-racing necessary in the success of an exhibition?" 127 replied "Yes," and 148 replied "No." Then this question was asked. "If other exhibitions were not allowed to hold horse-racing would your exhibition be able to get along without it?" The answers were, "Yes," 190, and "No," 64.

Mr. WALLACE: That report shows that the societies are not drifting in spending much money in the horse racing, it shows a more moderate rate and they are not getting from smaller expenditures to much larger and drifting from exhibitions to horse-racing.

Mr. Cowan: I am satisfied that the average is higher now than it was. We have societies offering $2,000, which they never did before.

Mr. William Scarff: In our society certain men give certain moneys for horse-racing, and they will give for nothing else. What are we to do with that?

Mr. Cowan: When this resolution was passed a year ago asking the Government to throw off all restrictions from horse-racing, the questions arose: What will be the effect if we do this How will it affect our societies as a whole? Where will our societies end up? We have this evidence before us of what has happened in other places. We know that a great majority of our societies are not doing it; no money has been spent on it; they haven't been holding horse-racing because they knew it was against the law. If all restrictions were thrown off there would be an immense increase. The resolution was passed. There was a campaign on the other side. Petitions poured into the agricultural press. Every leading agricultural paper we had came up and took a stand on it, showing that the doors should not be thrown open for a great increase on the debts. Should the Government set out to enforce the law? Possibly the Government should, but there is this point, that we have on the statute book a great many laws that the Government does not attempt to enforce. They are left to the people, and the Government is only human; it is not likely to take up a matter until the public are satisfied it should be. In the case of the Liquor License Act, it has got to where they are sending out inspectors. The Government is not likely to touch this until the public has got to the stage where the Government will have to do it. At the present the Government has not any intention of settling the laws; people take their own chances when they run against it.

A Member: Did they give any grants to the agricultural societies in the majority of the States?

Mr. Cowan: They did not give a cent, and in many cases because the societies have not used the funds to the best purposes. There is a possibility, as you can see, that the Ontario Government ultimately might be forced to the position that the States have been, where they say the money is not wisely expended, and that the agricultural societies are not entitled to it.

Mr. Saunders: A few years ago I was thrust into an argument on horse-racing. I do not know anything more about horse-racing than cooking, but I ran up against it under the old Act. Horse racing was prohibited, as it is under the present Act. While I feel that any representation made to the Government will be ineffective as to the right of having horse-racing, there is one point on which we should have a fuller understanding with the Government. Under the present Act any person can lay information against the directors of any Agricultural Society that permits horse-racing in its grounds. I don't think that is the position the Government ought to take—throwing the responsibility upon the society. We have many delegates here who are in favor of horse-racing, and I think they should have some consideration. If we had that section repealed, I think there would not be very much discussion upon horse-racing. Further than that, I was glad to hear Mr. Cowan say that he is becoming educated. He started his career opposed to this question of horse-racing, but changed his mind after he came amongst us. We are the people who have educated him; we are the people who have educated the Government; and we can further educate them in this direction if we take the right course. I had the honor of first being the Second Vice-President and subsequently President of this convention. I simply rise to make that explanation, and to ask that the sense of the meeting be taken now as to whether a show can be conducted without horse-racing.

RESOLUTION RE HORSE-RACING AT FAIRS.

Moved by W. A. Fry, and seconded by D. H. Price, "That this association memorialize the Government to amend the clause of the Act relating to horse-racing, replacing it with a clause permitting the individual fair boards to use their own discretion as to whether horse-racing shall or shall not be permitted, subject to restriction tending to eliminate all objectionable features, such as gambling, pool selling or betting."

In support of that, I might say that last year and this year the representatives who spoke unofficially for the Government have let the convention know that the Government were not going to deal partially with us. I say that if that is so, we are in a bad position. As long as we accept that Government grant we have to accept the restrictions that go with it. Four years ago, at the Dunnville Fair, while we were having a horse-race, a boy was killed, and I have no doubt if the Attorney-General had been at the Dunnville Fair we would have been liable for prosecution, every one of us. I think the Government should not put us in that position, and I will tell you, as far as Dunnville Fair is concerned, we want them to enforce the law, whatever law they make. We withdraw, and we would like to see the Government appropriate what we have accumulated. (Applause.) As regards the crowd that attend fairs, I think Mr. Cowan no doubt speaks to the best of his knowledge, but as many years as he has been Superintendent of Fairs he does not know as much as I do. I have been secretary five years, and the crowd that attends the Dunville Fair is as responsible a crowd as attends any church in the community, and I think that applies to any fair. Regarding the games of chance, he says that in the United States everything is wide open, and that it will tend to become the same thing here. We know in the United States that no doubt at some of the fairs where he got his statistics from games of chance are permitted by the majority, and no attempt made to stop it; but I want to tell you that the very first man that opened up under false pretences was arrested at Dunnville Fair by an Ontario Government officer, and if the objectionable features cannot be eliminated, then I say the Government show a great deal of weakness, if they can't stop it with the whole of the Ontario constabulary behind their backs.

Mr. Kaiser: I would like to have had that resolution read a second time. I have the idea that if a person had that resolution read over a second time, and thought of what it meant, not very many people would vote against it. It should not be left to any organized society to say as to whether it shall be the judge as to the vice of horse-racing. Why should we not be permitted to take this stand. I would like to see an unanimous vote on this question. I think we are endeavoring to do something, but I am working hard to do what I can do. We are not running an immoral institute in having a little horse-racing. I think nobody can see anything wrong, and say we are doing anything wrong, and I think the men representing the agricultural societies are the best men in the community, and why anybody should say that we shall not be our own judges is past me. I think every man in the Province should say that every society should be its own judge. I would like to see this unanimous vote, and then I think the Government would listen to our view.

The motion was then put and declared carried.

PROPOSED AMENDMENT TO ACT.

Moved by G. G. Henderson, of Sarnia, and seconded by David Evans, "That the Honorable the Minister of Agriculture be asked to have the Act respecting Agricultural Societies so amended as to allow societies some allowance for moneys spent on grounds, buildings, expert judges, and rents, as is allowed for other expenditure, as set forth in section 21 of the said Act."

Mr. Glendinning: I represent a society, and we have nearly one thousand dollars in the treasury. We have no buildings or grounds of our own, but we have grounds and buildings second to none, I suppose, in the Province. We rent them for one hundred dollars a year, and that expenditure has been reported to headquarters as expenditure for agricultural purposes.

Mr. W. D. Donaldson: Why should societies that own their own buildings and spend their own money not be allowed interest as well as those men who are getting rent?

Mr. Stevenson: I think if we entered into taking the Government grant to help the societies to build their agricultural buildings you will have a small grant to draw from for our prizes. We have got $70,000 to draw from. If you draw largely for buildings you won't have much for the prizes, so it is as broad as it is long, and there will be misrepresentation in the value of buildings. It costs a great deal more to put up buildings in a city than it does in a small village, and I think it should be left in that way.

A Member: It is unfair to societies. I know that in the last four or five years we have invested $30,600; consequently, for that amount of money, which we have so invested in the last two or three years, we will not draw a cent of the Government grant if this resolution goes through.

Mr. Evans: As seconder of this resolution, I think there should be a clause put in the regulations in regard to that. I represent Strathroy. We have buildings there that are as good as any buildings in the Province of Ontario, and they are paid for. But, gentlemen, we are not satisfied to remain there. The Government has asked us to give our energies and time to help agriculture, and we are putting our money there; but if we see fit to move a building and to spend $500 in the improvement of the cattle sheds for the protecting and housing of our cattle, I claim that the Government should give us a small, tangible grant towards that thing, because it is education we are seeking, and we should receive some encouragement from the Governmnt funds. I say it should be equally paramount with the show which only exposes its stock to the sun or inclement weather for two hours on a hot day.

The resolution was declared lost upon a vote being taken.

A Member: I would like to ask Mr. Cowan about these grants given to societies who do or do not hold horse-racing. If this is not changed it is possible that there may be some societies who may see fit to put on racing and not ask the Government for their grant, figuring that they can make more money by putting on horse-racing, than if they cut it out and accepted the grant. Would it be lawful for them to do so?

Mr. Cowan: Every society is acting under the Agriculture and Arts Act, and therefore if it cuts loose it practically has to be treated as if it was disorganized, and any society which is will be treated in the same way.

A Member: You will take our grounds?

A.—Yes.

A. F. Allen: In the event of not being able to do it that way, would it be lawful to have two days' fair, and after the fair was over to put on one day's racing and give the proceeds to the association?

The President: No; it would be tainted money. (Laughter.)

Mr. Cowan: I know societies hold horse-racing on other days, but the horse-racing is separate from the exhibition. I do not think there has been any objection so far as to that. When any society does not have its membership completed on the first of March, there is another clause of the Act which says that if they have it on the first of September it will be all right.

Mr. Hudspeth: We have been in existence for thirty years, and other societies doing business have only been incorporated five years. We have land and buildings valued at $5,000. and we have $1,400 of cash in the bank. Our Government grant amounts to $450. I want to ask, if we withdraw from this association have our assets to be confiscated by the Government?

Mr. Cowan: The way the Act reads now, the society that breaks the law with regard to horse-racing is subject to lose its grant. It doesn't say anything about grounds and buildings, but if a society continues to have horse-racing and loses this grant, it will create a new situation, which will have to be presented to the Government.

Mr. Kaiser: There is one thing I think this association should do, and that is to send a carefully selected delegation to the Government and press this motion which has been passed with regard to horse-racing. (Hear, hear.) I was amazed at the last speaker, from Caledonia, who wanted to know whether the assets of his association would be confiscated by the Government if they were to withdraw, and to take the attitude that they shall have horse-racing. Apparently you were afraid that would be so. I happened to be a delegate of an agriculture society in South Ontario, and I haven't any fears along that line. I am inclined to hope that the Government would take over our assets and our liabilities, and so on. I will tell you why. We happened to have been endeavoring to run an agricultural society, and we were being run by some of the experts. We were told by them that the proper way to do was to fall in line with Mr. Cowan's ideas, and Mr. Hodson's, and we took their ideas, and we got full of ideas, and the more ideas we got into the minds of the directors the more we got into debt every time, until we struck the point where they said we were to run a model fair, and they modelized us $4,000 in the hole. After we got into that position, we hoped that we would run horse-races, and let the Government take our assets and liabilities. (Laughter.) We have most success with the farmers. They come into town, and on fair day they want to go out to meet the girls from the country. The fact of the matter is that not one in ten is interested in the instructive part of the agricultural fair, but they are willing to put in the 25 cents to help the agriculturists along. We should not be living under humbug regulations. I do not believe the people of this country claim to be any better than the laws, and we should not have the laws better than the people. In Athens it was asked, "Are these the best laws that you can make for Athens?" and the answer was "Those are the best laws that the people of Athens can respect and obey." I think we should have no better laws than we can respect and obey, and I would like to see those laws so that we could live up to them. We do not want to be in the position of law breakers. I believe that if a delegation from this association was to go before the Hon. Mr. Monteith and lay these suggestions before him in the proper kind of way he would put this resolution that you have here to-day in some shape in the statutes of our country, and we can carry that out. I hope you will appoint that delegation before we depart this afternoon.

Mr. Farrow: I am very pleased with many of the remarks made by the gentlemen who preceded me, for the reason that the Minister of Agriculture has said plainly that he is one of the trustees of the Province of Ontario, that he has been placed there for the purpose of carrying out the opinions of the majority of the people of Ontario, and if this matter is not discussed here by the representatives it is utterly impossible for him to be guided by the thought of the people along these lines. Therefore it is important for the people to take this matter into consideration, move resolutions, and place them before the meeting, with the intention of getting them into the laws of this country, and when he finds that the representatives of the various fairs of this Province believe that the Act as it is framed is not in the best interest of the country, he is flexible enough to yield to your wishes. I want to say a word in reference to horse-racing. Although I have no fast horses, I am very much in favor of having this attraction at fairs, and I think this interpretation of the Act as to what is meant by horse-racing is a little too fine. When we speak of the horse-race we do not want to be confined to that class where we are put according to the Act. For instance, I can give you an illustration of a fair in the County of Lambton that is getting a grant of $116, and they are erecting fine buildings, and they have a fine membership, and it all goes to show that prosperity has been on their side. A gentleman came to that fair last fall, and he said to the directors, "I will give you $400 for the right to sell pools at your fair," and the directors said, "No, we want the best here. We want trials of speed here to show the superior qualities of the horses brought out by the public." Just the same as if you had a Clyde; it is utterly impossible to know the qualities of that Clyde until you put him to the test. The other horse is placed in his class to show off his speed. The result of this was that because the professional jockeys were not at the fair and were not able to get control of the races, the fastest horse won. The animal was valued in the neighborhood of $125 or $200, but after the fair the owner got $1,100 for it, because the horse went down the line and showed what he could do. If it was not for that trial of speed the farmer would have lost that amount of money. There was another horse there that sold for $1,500 after the fair which was only commanding an ordinary price previously. We believe the morals of the people in the outlying places is equal to that of those in the towns and the cities that are dictating to us. You are a very enthusiastic lot of gentlemen, but our means of organization is a little lacking. I think that if we had the Province of Ontario subdivided into sections, so that many fairs would send one or two representatives, and if you would organize so that each district would have their meeting at a special time, then we would be able to get along at the work faster.

Mr. Kaiser: I beg to move that a delegation of five from this meeting be sent to the Government, to request that this motion which has been passed here be framed into the statutes of our country.

Mr. Fry: I have pleasure in seconding that motion.

The President: I name the Executive of the Association, with the mover and seconder of the resolution, as the committee.

The President: The committee that has been appointed to arrange a uniform system of fair books will meet subsequent to this meeting at some time to be appointed by the superintendent, and it has been suggested that any secretary who has any suggestion to make will please send it to Mr. J. Lockie Wilson for representation to the committee. The committee is as follows: J. T. Murphy, Simcoe; T. F. Wallace, Woodbridge; G. G. Henderson, Hamilton; J. E. Johnson, Tweed; J. W. Sheppard, Cayuga; W. Laidlaw, Guelph; David Evans, Strathroy; J. Lockie Wilson, Toronto.

A hearty vote of thanks was given to the President for his faithful services during the two years he had held office.

APPENDIX.

The following is the statement of grants to Agricultural Societies for the years 1906 and 1907. The grants for 1906 were based on the former Agriculture and Arts Act; for 1907 they are based on the new Agricultural Societies Act, which came into force on the first day of February. 1907.

COMPARATIVE STATEMENT OF GRANTS TO AGRICULTURAL SOCIETIES FOR 1906 AND 1907.

The basis on which the Government Grants are apportioned in 1907 is on the expenditure for agricultural purposes only.

Societies that have received the increased grants are those which have chiefly utilized their funds for agricultural purposes.

ADDINGTON:	1906.	1907.
Addington	$395	$165
Centreville	140	81
Sheffield	56	32
ALGOMA:		
Central Algoma	380	536
Day and Bright	27	34
Iron Bridge	90	66
Johnson and Aberdeen.	28	69
North Shore	58	95
Bruce Mines	86	154
St. Joseph Island	47	105
Thessalon	84	106
West Algoma	436	294
Emo	112	198
McIrvine and Alberton.	140	308
Oliver	112	204
BRANT:		
Paris	660	375
Onondaga	140	156
South Brant	660	399
BRUCE:		
Paisley	436	290
Pinkerton	58	78
Huron Tp.	66	213
Kincardine	65	82
N. Bruce and Saugeen..	407	304
Wiarton	77	122
Arran and Tara	109	166
Underwood	76	139
Eastnor	38	85
Tiverton	62	103
Northern	380	231
Carrick	117	122
Teeswater	117	189
Lucknow	110	137
Chesley	66	164
CARLETON:		
Carleton	451	491
Fitzroy	124	149
Carp	140	278
March	85	61
DUFFERIN:		
Dufferin	405	222
East Luther	140	185
Dufferin Central	128	233

DUNDAS:	1906.	1907.
Dundas	$380	$276
Matilda	140	94
Mountain	140	199
Winchester	140	223
DURHAM:		
Millbrook	511	432
Port Hope	140	198
West Durham	491	348
Cartwright	119	145
Orono	109	206
ELGIN:		
East Elgin	509	439
Staffordville	64	98
South Dorchester	64	168
West Elgin	520	358
Aldborough	140	186
Shedden	140	103
ESSEX:		
Essex Co.	865	547
Comber	105	91
Amherstburg, Anderdon and Malden	105	159
Colchester South	105	213
Mersea, Leamington and South Gosfield	105	337
FRONTENAC:		
Frontenac	469	210
Kingston Tp.	92	81
Storrington	103	65
Wolfe Island	136	55
Parham	122	74
Kennebec	87	44
GLENGARRY:		
Glengarry	394	220
St. Lawrence Valley	266	265
Kenyon	140	177
GRENVILLE:		
South Grenville	520	292
Spencerville	140	113
GREY:		
East Grey	380	227
Priceville	51	94
Collingwood Tp.	57	136
Rocklyn	74	124
Holland	76	74

COMPARATIVE STATEMENT.—*Continued.*

GREY.—*Con.*	1906.	1907.
Osprey	$ 56	$103
Proton	76	144
Owen Sound	380	341
Kilsyth	84	153
Keppel	61	64
Meaford and St. Vincent	59	128
Desboro	84	137
Sydenham	83	113
South Grey	380	222
Hanover, Bentinck and Brant	97	108
Egremont	96	127
Markdale	82	74
Normanby	96	98
HALDIMAND:		
Haldimand	380	264
Southern Branch	88	105
Caledonia	96	373
Walpole	96	166
Canboro	38	39
Dunnville	95	112
HALIBURTON:		
Deer Lake	64	
Haliburton	116	56
Glamorgan	66	22
Minden	112	69
HALTON:		
Halton	380	394
Esquesing	100	220
Nassagaweya	82	119
Nelson and Burlington	100	149
Trafalgar	68	237
HASTINGS:		
Stirling	416	213
Marmora	140	121
Wollaston	140	56
Belleville	455	208
Tweed	140	187
Shannonville	123	93
Madoc	380	234
Bancroft	432	125
Maynooth	140	24
Dungannon and Faraday	140	39
Frankford	660	286
HURON:		
East Huron	511	233
Howick	104	111
Blyth	130	214
South Huron	380	215
Zurich	90	127
Bayfield	79	103
Exeter	90	169
Seaforth	89	170
West Huron	408	296
Dungannon	140	210
Turnberry	122	166
Kirkton	117	143
KENT:		
East Kent	380	219
Camden	105	119
Harwich	105	160
Howard	105	321
Orford	105	208
West Kent	$410	$336
Wallaceburg	129	102
Raleigh and Tilbury	121	218
Romney	140	84
LAMBTON:		
East Lambton	380	307
Bosanquet	96	134
Brooke and Alvinston	96	236
Florence	87	98
Plympton and Wyoming	45	140
West Lambton	492	540
Petrolea and Enniskillen	112	319
Moore	112	243
Sombra	84	105
Forest	......	199
LANARK:		
North Lanark	380	678
Dalhousie	125	173
Lanark Tp.	91	237
Pakenham	104	150
South Lanark	380	332
Lanark Village and Bathurst	159	156
Maberley	66	75
LEEDS, N., AND GRENVILLE:		
Merrickville	434	164
Lombardy	120	92
Frankville	140	179
Kemptville	106	177
LEEDS, SOUTH:		
Brockville	800	599
Delta	411	414
North Crosby	140	64
Lansdowne	140	181
Rear of Leeds and Lansdowne	109	85
LENNOX:		
Lennox	384	336
Amherst Island	137	52
Ernestown	139	72
LINCOLN:		
Monck	380	123
Abingdon	95	110
Clinton Tp.	77	166
Grantham	44	
Peninsular Central	74	114
Niagara Town and Tp.	350	205
MANITOULIN:		
Gore Bay	380	323
Manitowaning	99	154
Billings	114	119
Providence Bay	101	84
Howland	106	82
MIDDLESEX:		
Dorchester	105	191
London Tp.	105	187
Thorndale	105	146
Westminster	105	108
North Middlesex	436	211
McGillivray	62	49
Parkhill	82	178
West Middlesex	380	292

COMPARATIVE STATEMENT.—*Continued.*

MIDDLESEX.—*Con.*	1906.	1907.
Lobo	$110	$ 77
Metcalfe	84	69
Adelaide	110	77
London District	210	111
Caradoc	84	109
East Middlesex	380	116
Delaware	84	106
Mosa and Ekfrid	84	133
MUSKOKA:		
North Muskoka	448	310
Stephenson and Watt	140	174
Stisted	140	141
South Muskoka	385	555
Baysville	58	69
Medora and Wood	121	130
Morrison	96	72
Gravenhurst & Muskoka	140	189
NIPISSING:		
Sudbury	......	211
Bonfield	140	107
Astorville	140	55
Sturgeon Falls	550	281
Caldwell	140	125
Widdifield	250	...
New Liskeard	380	253
NORFOLK:		
Norfolk Co.	760	669
Courtland	122	91
Townsend	113	114
Windham	122	124
Charlotteville	122	171
Houghton	123	122
N. Walsingham	123	116
NORTHUMBERLAND:		
E. Northumberland	453	352
Brighton	92	122
Cramahe	85	248
Wooler	77	68
Seymour	93	155
Cobourg Central	520	338
Alnwick	140	136
ONTARIO:		
Ramona	50	34
Uxbridge	380	166
Brock	86	177
Scott	80	123
Port Perry, Reach and Scugog	90	48
Beaverton	86	98
South Ontario	800	326
OXFORD:		
Woodstock	452	333
Drumbo	86	298
East Nissouri	77	93
West Zorra and Embro	87	164
Tavistock	70	197
South Oxford	380	181
Tillsonburg and Dereham	86	212
North Norwich	86	131
South Norwich	86	134
Ingersoll, North and West Oxford	86	82
Armour, Ryerson and Burk's Falls	380	449

PARRY SOUND:	1906.	1907.
Magnetawan	$ 64	$122
McMurrich	67	66
Machar	73	194
Perry	131	152
Strong	85	132
Powassan	380	267
Parry Sound	454	281
United Townships	140	106
Rosseau	138	119
McKellar	140	159
PEEL:		
Albion and Bolton	140	219
Caledon	140	202
Peel	408	441
Toronto Tp.	140	301
Toronto Gore	140	67
PERTH:		
Stratford	380	190
Elma	89	125
Listowel	96	180
Mornington	96	217
South Perth	380	253
Fullarton, Logan and Hibbert	118	207
PETERBOROUGH:		
East Peterborough	380	330
Galway	122	64
Otonabee	124	126
Peterborough Ind.	395	599
Lakehurst	75	41
South Monaghan	114	62
Lakefield	140	99
PRESCOTT:		
Vankleek Hill	442	261
Alfred	140	128
South Plantagenet	140	119
PRINCE EDWARD:		
Prince Edward	410	416
Ameliasburg	140	153
Sophiasburg	138	87
RENFREW:		
N. Renfrew	590	395
Renfrew	454	495
Radcliffe	136	47
Cobden	140	103
RUSSELL:		
Russell Co.	380	436
Casselman	108	58
Clarence	112	85
Russell Tp.	138	185
SIMCOE:		
Beeton	520	231
East Simcoe	380	252
Coldwater	104	193
Oro	104	141
Tiny and Tay	104	182
Cookstown	520	263
Bradford and W. Gwillimbury	140	219
Alliston	140	228
Barrie	468	371
Elmvale	87	252
Nottawasaga	88	336

COMPARATIVE STATEMENT.—*Concluded.*

	1906.	1907.
Stormont:		
Cornwall	$350	$222
Stormont	407	177
Osnabruck	140	113
Roxborough	140	88
Finch	113	78
Victoria:		
N. Victoria	380	218
Fenelon	118	98
Eldon	138	166
Somerville	101	53
South Victoria	380	493
Mariposa	102	127
Verulam	87	121
Waterloo:		
Berlin	380	304
Wellesley and N. Easthope	120	199
Elmira and Woolwich	121	164
South Waterloo	380	469
Wilmot	126	202
Welland:		
Fenwick	95	189
Wainfleet	53	82
Welland	380	214
Bertie	107	129
Stamford and Niagara Falls	67	231
Thorold Town and Tp.	96	124
Wellington:		
Centre Wellington	461	357
Pilkington	90	81
Erin	91	289

	1906.	1907.
West Garafraxa	$ 77	$ 64
Guelph and South Wellington	485	800
Rockwood	105	186
Puslinch	105	172
W. Wellington	440	183
Arthur	76	181
Maryborough	59	87
Palmerston	76	108
Peel and Drayton	76	127
Mount Forest	......	153
Wentworth:		
North Wentworth	380	146
Rockton	140	297
Waterdown	140	206
Dundas	140	108
South Wentworth	380	211
Ancaster	117	251
Glanford	106	96
Binbrook	81	98
Saltfleet	116	108
York:		
East York and Markham	590	800
Scarboro'	140	332
Newmarket	380	576
Sutton	114	174
Queensville	118	115
Schomberg	117	277
Woodbridge	596	574
Weston, York and Etobicoke	274	299
Toronto Electoral	410	127

Special Grants.

	1906.	1907.
Walter's Falls	......	$161
Dryden	......	204
Amherst Island	......	88

Indian Societies:	1906.	1907.
Six Nations	$100	$100
Oneida	50	50
Chippewa	75	75
Muncey	75	......

GRANTS TO THE CANADIAN NATIONAL EXHIBITION, THE WESTERN FAIR, AND THE CENTRAL CANADA EXHIBITION.

Canadian National	$2,500
Western Fair	1,109
Central Canada	953
	$4,562

GRANTS TO SPRING SHOWS, 1907.

Stallion Shows.

Egremont	$36
Wellesley and N. Easthope	28
Barrie	43
Cookstown	24
Walpole	9
Norfolk Co.	23
East Elgin	27
Collingwood Tp.	16
Peninsular Central	18
Haldimand	15

Elma	$33
Owen Sound	47
Moore	23
Plympton and Wyoming	40
South Lanark	50
Mosa and Ekfrid	47
Comber	8
Dunnville	26
Mornington	30
Guelph	50

STALLION AND BULL SHOWS.

Weston, York and Etobicoke	$50	North Bruce and Saugeen	$45
Arran and Tara	50	Elmvale	21
East Simcoe	50	Rocklyn	39
Fullarton, Logan and Hibbert	50	Nottawasaga	45
West Kent	50	West Durham	36
		Ops	30

STALLION, BULL, AND SEED SHOWS.

Meaford and St. Vincent	$52	Astorville	$47
Northern	75	Westminster	41
Blyth	57	Listowel	62
Maryborough	67	Frankford	75
East Luther	56	Caledonia	21
Mt. Forest	46	North Renfrew	21
West Wellington	67	Beeton	52
Strong	46	Tavistock	55
Renfrew	29		

SEED SHOWS.

Minden	$13	Norfolk	$15

GRANTS TO SOCIETIES OWNING PURE-BRED STOCK, 1907.

Oldcastle	$320	Dummer and Douro	$260
Drummond	70	Emily	90
Osgoode	120	Ops	20

FALL FAIRS AND EXHIBITIONS.

LIST OF PLACES IN ONTARIO AT WHICH EXHIBITIONS ARE HELD, WITH DATES AS FAR AS REPORTED TO THE SUPERINTENDENT.

Abingdon	Oct. 16 and 17.
Alexandria	Sept. 9 and 10.
Alfred	Sept. 24 and 25.
Alliston	Oct. 3 and 4.
Almonte	Sept. 24, 25, 26.
Alvinston	Oct. 2 and 3.
Ameliasburg	Oct. 4 and 5.
Amherstburg	Oct. 1 and 2.
Arthur	Sept. 19.
Atwood	Oct. 1, 2.
Avonmore	Sept. 25, 26.
Aylmer	Sept. 2, 3, 4, 5, 6.
Baden	Sept. 18, 19.
Barrie	Sept. 23, 24, 25.
Bar River	Sept. 24.
Baysville	Oct. 2.
Beachburg	Oct. 3, 4.
Becher	Sept. 25.
Beeton	Sept. 26, 27.
Belleville	Sept. 17, 18.
Berwick	Sept. 12, 13.
Binbrook	Oct. 7, 8.
Blackstock	Oct. 1, 2.
Blyth	Sept. 23, 24.
Bobcaygeon	Sept. 25, 26.
Bothwell	Sept. 26, 27.
Bowmanville	Sept. 26, 27.
Bracebridge	Sept. 26, 27.
Bradford	Oct. 15, 16.
Brampton	Sept. 19, 20.
Brigden	Oct. 1.
Brighton	Sept. 26.
Brockville	Sept. 10, 11, 12, 13.
Bruce Mines	Sept. 25.
Brussels	Oct. 3, 4.
Burford	Oct. 1, 2.
Burks Falls	Oct. 3, 4.
Caledon	Oct. 3, 4.
Caledonia	Oct. 10, 11.
Campbellford	Sept. 24, 25.
Campbellville	Oct. 8.
Canada Central, Ottawa	Sept. 13-21.
Carp	Oct. 1, 2.
Casselman	Sept. 17.
Castleton	Oct. 1, 2.
Cayuga	Sept. 24, 25.
Chatsworth	Sept. 17, 18.
Chesley	Sept. 16, 17.
Clarksburg	Oct. 1, 2.
Cobden	Sept. 23, 24.
Coe Hill	Sept. 20.
Colborne	Sept. 30, Oct. 1.
Collingwood	Sept. 24, 25, 26, 27.
Comber	Sept. 30, Oct. 1,
Cookstown	Oct. 1, 2.
Cornwall	Sept. 25, 26, 27.
Courtland	Oct. 6.
Delaware	Oct. 16.
Delta	Sept. 24, 25.
Desboro	Sept. 26, 27.
Dorchester	Oct. 2.
Dresden	Oct. 8, 9.
Drumbo	Sept. 24, 25.
Dunchurch	Oct. 4.
Dundalk	Oct. 3, 4.
Dunnville	Sept. 17, 18.
Durham	Sept. 24, 25.
Elmvale	Oct. 7, 8, 9.
Embro	Oct. 3.
Emo	Sept. 19, 20.
Emsdale	Sept. 24, 25.
Erin	Oct. 16, 17.
Essex	Sept. 24, 25, 26.
Exeter	Sept. 16, 17.
Fair Ground	Oct. 4.
Fenella	Sept. 26, 27.
Fenwick	Sept. 30, Oct. 1.
Fergus	Oct. 1, 2.
Feversham	Oct. 3, 4.
Flesherton	Sept. 26, 27.
Florence	Oct. 3, 4.
Forest	Sept. 17, 18.
Fort Erie	Oct. 3, 4.
Fort Frances	Sept. 17, 18.
Frankford	Sept. 19, 20.
Frankville	Sept. 26, 27.
Galt	Oct. 1, 2.
Georgetown	Oct. 1, 2.
Glencoe	Sept. 24, 25.
Goderich	Sept. 25, 26, 27.
Gooderham	Oct. 3.
Gordon Lake	Sept. 27.
Gore Bay	Oct. 3, 4.
Grand Valley	Oct. 15, 16.
Guelph	Sept. 17, 18, 19.
Haliburton	Sept. 26.
Hanover	Sept. 26, 27.
Harriston	Sept. 26, 27.
Harrow	Oct. 8, 9.
Highgate	Oct. 11, 12.
Holstein	Oct. 1.
Huntsville	Sept. 24, 25.
Ilderton	Sept. 27.
Ingersoll	Sept. 24, 25.
Inverary	Sept. 18.
Jarvis	Oct. 3, 4.
Keene	Oct. 2, 3.
Kemble	Sept. 26, 27.
Kemptville	Sept. 17, 18.
Kincardine	Sept. 18, 19.
Kinmount	Sept. 10, 11.
Kilsyth	Oct. 10, 11.
Kirkton	Oct. 3, 4.
Lakefield	Sept. 24, 25.
L'Amable	Oct. 1.
Lakehurst	Oct. 3, 4.
Langton	Oct. 12.
Lansdowne	Sept. 26, 27.
Leamington	Oct. 2, 3, 4.
Lindsay	Sept. 19, 20, 21.
Listowel	Sept. 24, 25.
Little Current	Sept. 26.
Lombardy	Sept. 28.
London, Western Fair,	Sept. 6-14.
Loring	Oct. 4.

Lucknow	Sept. 30, Oct. 1.
Lyndhurst	Sept. 19, 20.
Madoc	Sept. 12, 13.
Manitowaning	Oct. 1, 2.
Markdale	Oct. 1, 2.
Markham	Oct. 2, 3, 4.
Marshville	Sept. 27, 28.
Mattawa	Sept. 26, 27.
Maxville	Sept. 24, 25.
McDonald's Corners	Sept. 26 and 27.
Meaford	Sept. 26, 27.
Merrickville	Sept. 19, 20.
Metcalfe	Sept. 24, 25.
Midland	Sept. 26, 27.
Millbrook	Oct. 3, 4.
Mildmay	Sept. 23, 24.
Milton	Oct. 10, 11.
Milverton	Sept. 26, 27.
Mohr's Corners	Sept. 30, Oct. 1.
Morrisburg	Sept. 3, 4.
Morriston	Oct. 1.
Mt. Brydges	Oct. 4.
Mt. Forest	Sept. 17, 18.
Mt. Hamilton	Oct. 3, 4.
Mt. Hope	Oct. 2,
Murillo	Oct. 2.
Napanee	Sept. 18, 19.
Newboro	Aug. 31, Sept. 2.
New Hamburg	Sept. 18, 19.
Newington	Sept. 10, 11.
New Liskeard	Sept. 26, 27.
Niagara Falls	Sept. 26, 27.
Niagara-on-the-Lake	Sept. 23, 24.
Norwich	Sept. 17, 18.
Norwood	Oct. 8, 9.
Oakville	Sept. 26, 27.
Onondaga	Oct. 1.
Orangeville	Sept. 26, 27.
Orono	Sept. 16, 17.
Oshawa	Sept. 24, 25.
Osnabruck Centre	Oct. 1, 2.
Ottawa (Canada Central)	Sept. 13-21.
Otterville	Oct. 4, 5.
Owen Sound	Sept. 13, 14.
Paisley	Sept. 24, 25.
Pakenham	Sept. 16, 17.
Palmerston	Sept. 19, 20.
Paris	Sept. 26. 27.
Perth	Sept. 4, 5, 6.
Peterboro	Sept. 26, 27, 28.
Petrolea	Sept. 19, 20, 21.
Picton	Sept. 25, 26.
Port Arthur	Sept. 23-27.
Port Carling	Sept. 20.
Port Elgin	Sept. 26, 27.
Port Hope	Oct. 1, 2.
Powassan	Oct. 2, 3.
Prescott	Sept. 18, 19, 20.
Priceville	Oct. 3, 4.
Queensville	Oct. 9, 10.
Rainham Centre	Sept. 19.
Renfrew	Sept. 23, 24, 25.
Richmond	Sept. 23, 24, 25.
Ripley	Sept. 24, 25.
Rocklyn	Oct. 3, 4.
Rockton	Oct. 8, 9.
Russell	Sept. 27.
Sarnia	Sept. 23, 24, 25.
Scarboro	Sept. 25.
Seaforth	Sept. 19, 20.
Shannonville	Sept. 28.
Shanty Bay	Sept. 17.
Shedden	Sept. 25.
Shelburne	Sept. 24, 25.
Simcoe	Sept. 24, 25, 26.
Smithville	Sept. 27, 28.
South Mountain	Sept. 12, 13.
Spencerville	Oct. 1, 2.
Springfield	Sept. 19, 20.
Sprucedale	Sept. 27.
Stirling	Sept. 26, 27.
St. Marys	Sept. 25, 26.
Stoney Creek	Sept. 26, 27.
Straffordville	Sept. 18.
Stratford	Sept. 20, 21.
Strathroy	Sept. 16, 17, 18.
Streetsville	Sept. 25.
Sundridge	Oct. 2, 3.
Sutton	Sept. 26, 27.
Tara	Oct. 1, 2.
Tavistock	Sept. 16, 17.
Teeswater	Oct. 3, 4.
Thamesville	Oct. 1, 2.
Thedford	Sept. 24.
Thorndale	Oct. 1.
Thorold	Oct. 8, 9.
Tillsonburg	Oct. 1, 2.
Tiverton	Oct. 1.
Tweed	Oct. 2.
Underwood	Oct. 8.
Utterson	Oct. 1 and 2.
Vankleek Hill	Sept. 13, 14.
Verner	Sept. 9, 10.
Victoria Road	Sept. 17, 18.
Waterford	Oct. 3.
Watford	Sept. 25, 26.
Wallaceburg	Oct. 3, 4.
Wallacetown	Sept. 26, 27.
Walkerton	Sept. 19, 20.
Walsh	Oct. 22.
Walters Falls	Sept. 24, 25.
Warkworth	Oct. 3, 4.
Waterdown	Oct. 1.
Welland	Oct. 1, 2.
Wellandport	Oct. 10, 11.
Wellesley	Sept. 23, 24.
Western Fair, London	Sept. 6-14.
Wiarton	Sept. 25, 26.
Wilkesport	Sept. 26.
Williamstown	Sept. 25, 26.
Winchester	Sept. 5, 6.
Windham Centre	Oct. 8.
Wingham	Sept. 26, 27.
Woodstock	Sept. 18, 19, 20.
Wooler	Sept. 18.
Wyoming	Sept. 27, 28.
Zurich	Sept. 18, 19.

Second Annual Report

OF

The Horticultural Societies of Ontario

For the Year

1907

(*PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE.*)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
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1908

WARWICK BRO'S & RUTTER, Limited, Printers,
TORONTO.

To the Honorable SIR WILLIAM MORTIMER CLARK, K.C.,
Lieutenant-Governor of the Province of Ontario.

May it Please Your Honor:

I have the pleasure to present herewith for the consideration of your Honor the Report of The Horticultural Societies of Ontario for the year 1907

Respectfully yours,

NELSON MONTEITH,
Minister of Agriculture.

Toronto, 1908.

ANNUAL REPORT

OF

The Horticultural Societies

OF ONTARIO

1907.

To the HONORABLE NELSON MONTEITH, Minister of Agriculture.

SIR,—I have the honor to present, herewith, the Second Annual Report of the Horticultural Societies of Ontario for the year 1907, together with a statement of the receipts and expenditure of each society, and a comparative list of members and legislative grants in 1906 and 1907.

I have the honor to be, Sir,

Faithfully yours,

J. LOCKIE WILSON,

Superintendent.

ONTARIO HORTICULTURAL ASSOCIATION.

OFFICERS FOR 1908.

President..Major H. J. Snelgrove, Cobourg.
1st Vice-President..R. B. Whyte, Ottawa.
2nd Vice-President..R. Cameron, Niagara Falls.
Secretary-Treasurer..H. B. Cowan, Peterboro.
Corresponding Secretary and Editor................................J. Lockie Wilson, Toronto.

Directors:

Rev. A. H. Scott, M.A., Perth ; W. Jeffers Diamond, Belleville ; H. R. Frankland, Toronto ;
A. Alexander, Hamilton ; Isaac Lanstrath, Seaforth ; J. Rose, Brantford ;
J. S. Pearce, London.

Honorary Director..W. B. Burgoyne, St. Catharines.

Auditors:

J. O. McCulloch, Hamilton ; Mrs. Robert McDowell, Owen Sound.

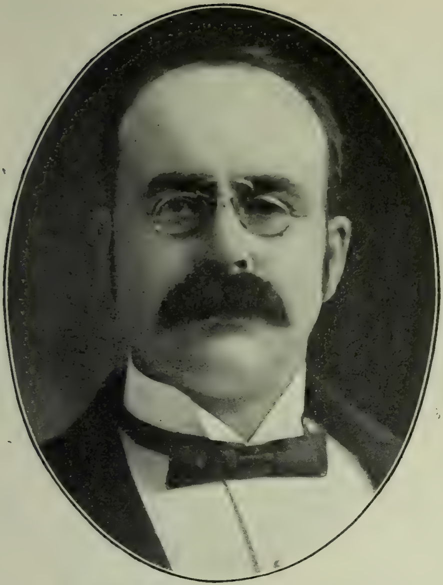
COMMITTEES FOR 1908.

On Nomenclature: R. Cameron, Niagara Falls; Jno. Cavers, Oakville ; H. B. Cowan, Peterboro ; Wm. Hunt, O.A.C., Guelph ; W. T. Macoun, C.E.F., Ottawa.

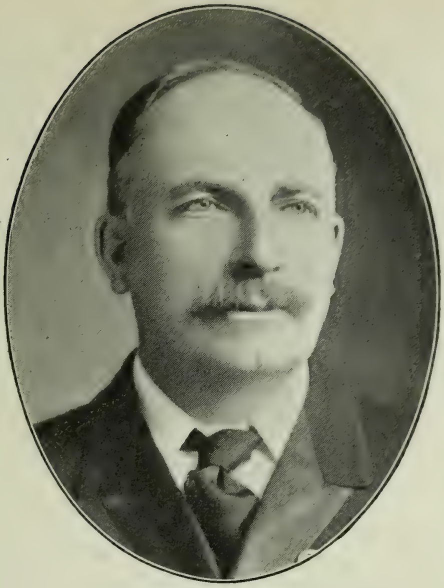
On Novelties: W. T. Macoun, C.E.F., Ottawa ; Prof. H. L. Hutt, O.A.C., Guelph ; Miss Blacklock, Toronto.

Press Committee: Jno. Cavers, Oakville ; W. T. Macoun, C.E.F., Ottawa : Rev. A. H. Scott, Perth.

Committee on the incorporation of Horticultural Topics in new series of School Books: Rev. A. H. Scott, Perth ; W. B. Burgoyne, St. Catharines ; J. S. Pearce, London.

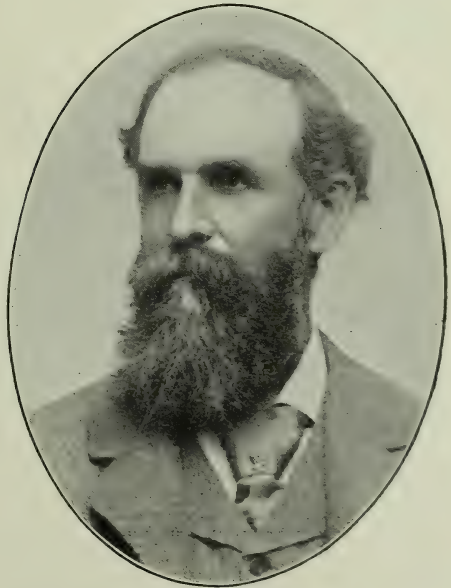


Major H. J. Snelgrove, Cobourg,
President of the Ontario Horticultural Association.

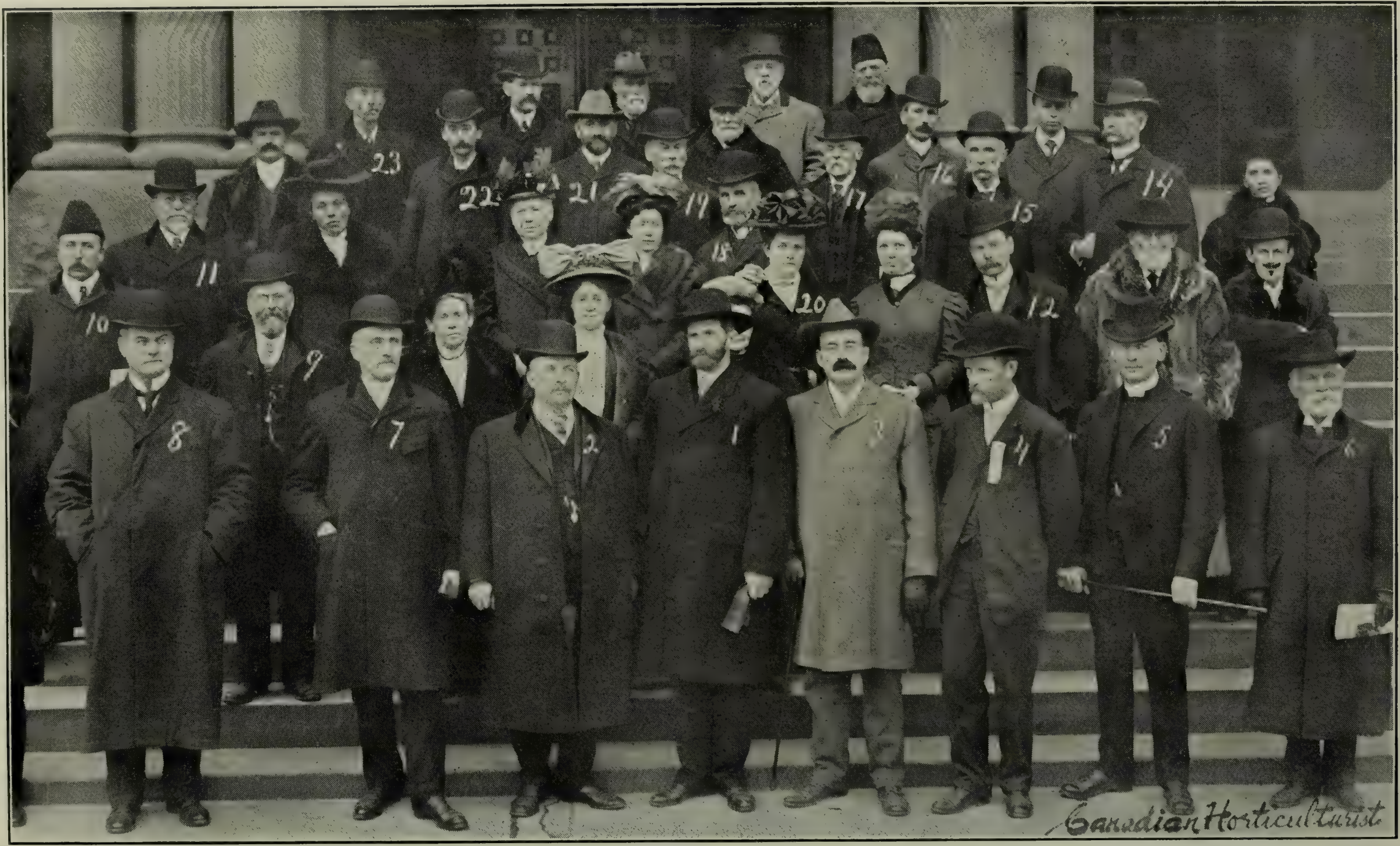


W. B. Burgoyne, St. Catharines,
Ex-President and Honorary Director.

R. B. Whyte, Ottawa,
First Vice-President.



Roderick Cameron, Niagara Falls South,
Second Vice-President.



Officers and Delegates at Horticultural Convention, 1907.—1. J. Lockie Wilson. 2. W. B. Burgoyne. 3. Maj. H. J. Snelgrove. 4. R. B. Whyte. 5. Rev. A. H. Scott. 6. W. J. Diamond. 7. . 8. H. J. Frankland. 9. R. W. Brooks. 10. G. W. Tebbs. 11. J. S. Pearce. 12. J. O. McCulloch. 13. R. Govenlock. 14. R. Jarvis. 15. T. H. Lennox. 16. W. T. Macoun. 17. Wm. Hunt. 18. Alex McNeill. 19. John Cavers. 20. Mrs. R. MacDowall. 21. J. M. Dickson. 22. C. W. Schierholtz. 23. W. C. Reid.

ONTARIO HORTICULTURAL ASSOCIATION.

ANNUAL MEETING.

The second annual meeting of the Ontario Horticultural Association was held in the City Hall, Toronto, on November 14th and 15th, 1907. There were 58 delegates present, and they had the pleasure of listening to some of the best addresses on horticultural subjects that have ever been delivered before the Association.

DELEGATES IN ATTENDANCE.

Name.	Society.	Name.	Society.
W. B. Burgoyne	St. Catharines.	Geo. W. Tebbs	Hespeler.
Joseph Barker	Kincardine.	Rev. A. H. Scott	Perth.
Mrs. G. F. McKinnon	Smith's Falls.	W. C. Reid	Belleville.
Mrs. R. C. Currie	Smith's Falls.	H. L. Hutt	Guelph.
J. Cavers	Oakville.	J. T. Rose	Brantford.
C. F. Schierholtz	Elmira.	Linus Woolverton	Grimsby.
M. E. Blacklock	Toronto.	H. B. Cowan	Toronto.
P. C. L. Harris	Guelph.	Daniel Denton	Cobourg.
Mrs. Robt. McDowall	Owen Sound.	J. G. Jackson	Cobourg.
Isabel C. Mackenzie	Toronto.	John Cape	Hamilton.
W. T. Macoun	Ottawa.	J. O. McCulloch	Hamilton.
A. A. Wright	Renfrew.	T. H. Lennox	Stratford.
Rod'k Cameron	Niagara Falls.	S. B. Webb	Stratford.
W. W. Gammage	London.	John Dawson	St. Catharines.
J. S. Pearce	London.	E. A. Morden	Oakville.
Wm. Hunt	Guelph.	Mrs. E. A. Morden	Oakville.
Richard Jarvis	Bowmanville.	Mrs. Curtis Bogart	Belleville.
H. J. Snelgrove	Cobourg.	H. R. Frankland	Toronto.
Jas. Guilfoyle	Collingwood.	C. L. Stephens	Orillia.
W. Jeffers Diamond	Belleville.	H. W. Brown	Orillia.
R. B. Whyte	Ottawa.	Jas. R. Jarvis	Toronto.
Jas. Anderson	Hamilton.	J. Lockie Wilson	Toronto.
A. Alexander	Hamilton.	G. A. Putnam	Toronto.
Jas. Ogilvie	Hamilton.	Rev. J. F. Rounthwaite	Brantford.
J. M. Dickson	Hamilton.	B. Leslie Ainslie	Toronto.
W. D. Hoag	Seaforth.	Miss L. Rowe	Toronto.
W. Moore	London.	Miss M. Wilson	London.
R. W. Brooks	Brantford.	H. J. Graham	Seaforth.
S. Short	Ottawa.		

PRESIDENT'S ADDRESS.

By W. B. Burgoyne, St. Catharines.

It is with great pleasure that I greet you at this second annual convention of the Ontario Horticultural Association. In accordance with the suggestion made at our last meeting, your Executive Committee decided that the convention this year should extend over two days, and you will agree that the programme prepared is one of great interest and importance, indicating the many phases of the work which the Horticultural Societies of the Province are engaged in promoting. It is, I think, not open to question, that more than ever the Horticultural Societies are justifying their existence, and the aid which the Government of the Province is extending, by the increasing interest in the work of civic improvement, the beautifying of all our home surroundings and the interesting of the young boyhood and girlhood in the study and culture of plants and flowers, which will make our cities, towns, and villages and even the rural sections a reputation for civic beauty not equalled in any other section of this continent.

As intimated by Mr. Cowan at our last meeting, he shortly afterwards retired from the position of Superintendent of Horticultural Societies, in which he had been instrumental in placing our organization upon a more satisfactory basis than it had ever been in before. He was succeeded, as you are aware, by Mr. J. Lockie Wilson, and I am glad to say that our new Superintendent has shown, during the year, that he fully appreciates the importance of the work in which our societies are employed, and his anxiety to improve, where possible, the conditions under which they are operating, is very manifest. I am glad to welcome him to-day to our meeting, and I am sure in this welcome you will all most heartily join.

It is also a pleasurable duty and privilege to acknowlege the continued interest taken in our work by the Minister of Agriculture, Hon. Mr. Monteith, and his efficient deputy, Mr. C. C. James.

Under the operations of the new Act, a few Horticultural Societies have passed out of existence. There have been instances where they were mere annexes to the larger Agricultural Societies, doing little or no work of their own, and handing over their funds to them for exhibition work. It is not to be doubted that the entire separation of Horticultural and Agricultural Societies will work out for the fulfilment of the special work and the discharge of the responsibilities which devolve upon our Horticultural Societies, and which will enhance the beauty of the towns where live Horticultural Societies are at work.

It would be superfluous now to go largely into the questions which will engage your attention. Nearly every one is in charge of men who are far more qualified to speak upon them than myself, and your time will be fully occupied in hearing the addresses which they will give and the discussions which will naturally ensue, and the other business which will command your attention.

In retiring from this honored position to which you have twice elected me, as I will do at this session, I have to thank you sincerely for the honor thus conferred, and for the unvarying kindness shown, and bespeak for my successor the same consideration.

I cannot close this brief address without expressing my appreciation of the invaluable work rendered by our secretary, Mr. Cowan, and the cooperation of the members of the executive.

ANNUAL REPORT OF SECRETARY TREASURER.

By H. B. Cowan, Toronto.

It was with considerable pleasure that I noted the confident manner in which Mr. Burgoyne referred to the future of our Association. As some of you may remember three years ago, when we discussed separating from the Fruit Growers' Association, and having an independent organization, we were told that we could not succeed and that we could not arouse any interest, and, therefore, it is satisfactory to find that we have such an association as this. One of the best features of our work this year was made evident when you received our first annual report. As those of you who have seen it will know, it deals exclusively with the work of horticultural societies. We were able to distribute these through the kindness of Hon. Mr. Monteith, who consented to arrange for the printing of our annual reports, for which there has been a considerable demand.

Civic Improvement.

Copies of that report have been distributed to societies who wished to start exhibitions in which they could interest their school children, and it is doing much good. Your directors have mapped out a line of work which we think will be productive of great benefit. There are sections of the Province where there are no Horticultural Societies, and we intend writing to the mayors and newspaper men at these points, to get them interested in this excellent work. If we look at it in a selfish light, it is not good for us to start new societies, because the more societies the less will be the grant to those now in existance; but, if we look at it from a broader plane, I think our chances of having a larger grant are improved by having more societies.

We tried to have Mr. J. Horace McFarlane, the President of the Civic Improvement Association of the United States come over and address our Horticultural Societies on Civic Improvement. Unfortunately he met with an accident and our plans were frustrated. I desire to thank our Superintendent, Mr. J. Lockie Wilson, for consenting to defray part of the expenses of Mr. McFarlane's proposed trip.

An important matter, viz., the classification of varieties of flowers, was raised by Mr. Cavers, the secretary of the Oakville Society early in the season. Those flower growers who have been ordering considerable quantities of flowers from the catalogues sent out by the seedsmen have had the experience of ordering new varieties and finding that they are old ones.

We should endeavor to co-operate with some of the Experimental Stations in the United States, and have each station test the varieties of some one flower, such as phlox or peonies, and report the results to the various stations; then, let each station take the conclusions of the others and accept them as a standard. This matter was taken up with Mr. Macoun, of the Experimental Farm, Ottawa, who was not in a position to go on with the work this year. I will not refer to it further because it is to be discussed to-morrow. It opens up a new line of work for this association. We need to ask ourselves before undertaking it, what we desire this association to do. Shall we confine our work mainly to simply gathering reports from officers of our societies and discussing the management of our Horticultural Societies and having discussions on flowers; or shall we look at the work in a broader light and undertake experiments, or the promotion of experiments, of the nature referred to? That is all I will report in regard to the work of the Association.

FINANCIAL STATEMENT.

For the year ending October 31st, 1907.

Receipts.

Fees—Seaforth Society	$2 00	
“ Cobourg Society	2 00	
“ St. Catharines	2 00	
“ Perth	2 00	
“ Ottawa	2 00	
“ Oakville	2 00	
“ Belleville	2 00	
“ Bowmanville	2 00	
“ Collingwood	2 00	
“ Kincardine	2 00	
“ Hespeler	2 00	
Government Grant	100 00	
Fees—Woodstock	2 00	
Interest	40	
Fees—London Society	2 00	
“ Grimsby	2 00	
“ Brantford	2 00	
“ Smithville	2 00	
Interest, 55c., 70c., 65c.	1 90	
		$134 30

Expenditure.

S. Short, expenses	$13 25	
J. F. Osborne, printing	12 00	
H. B. Cowan, to be accounted for	5 00	
R. B. Whyte, Ottawa, expenses	13 40	
Major Snelgrove	4 80	
Exchange	15	
Cash on hand	85 70	
		$134 30

Certified correct.

(Signed) M. A. McDowall }
J. O. McCulloch } Auditors.

Every horticultural society in the Province ought to be affiliated with our Association. At present, only a comparatively small number are. We are endeavoring to advance the interests of every society. The fact that we have a grant this year of $8,000 instead of $6,500 is largely due to this Association. It means that $1,500 more are being divided among the horticultural societies, and we feel that every society should stand by us.

The report was received and adopted.

The President: I am glad that the first paper on the programme is allotted to our new Superintendent of Horticultural Societies, because it enables me to introduce him to you at the beginning of this meeting and, in that way, to make him feel right at home in our midst and in touch with all our work. You will observe from the remarks of our Secretary, Mr. Cowan, that our Association was started under the most auspicious circumstances, and this is the third session since the first meeting was held at which an Association was decided upon. We have grown at each session. We have the largest number of members now that we have had at any time, and we look forward for continued growth during the year. Since Mr. Wilson accepted the responsible position which he occupies I have had several opportunities of meeting him and conversing with him in his office, and have always found him most anxious to forward in every way the work of the Horticultural Societies of this Province.

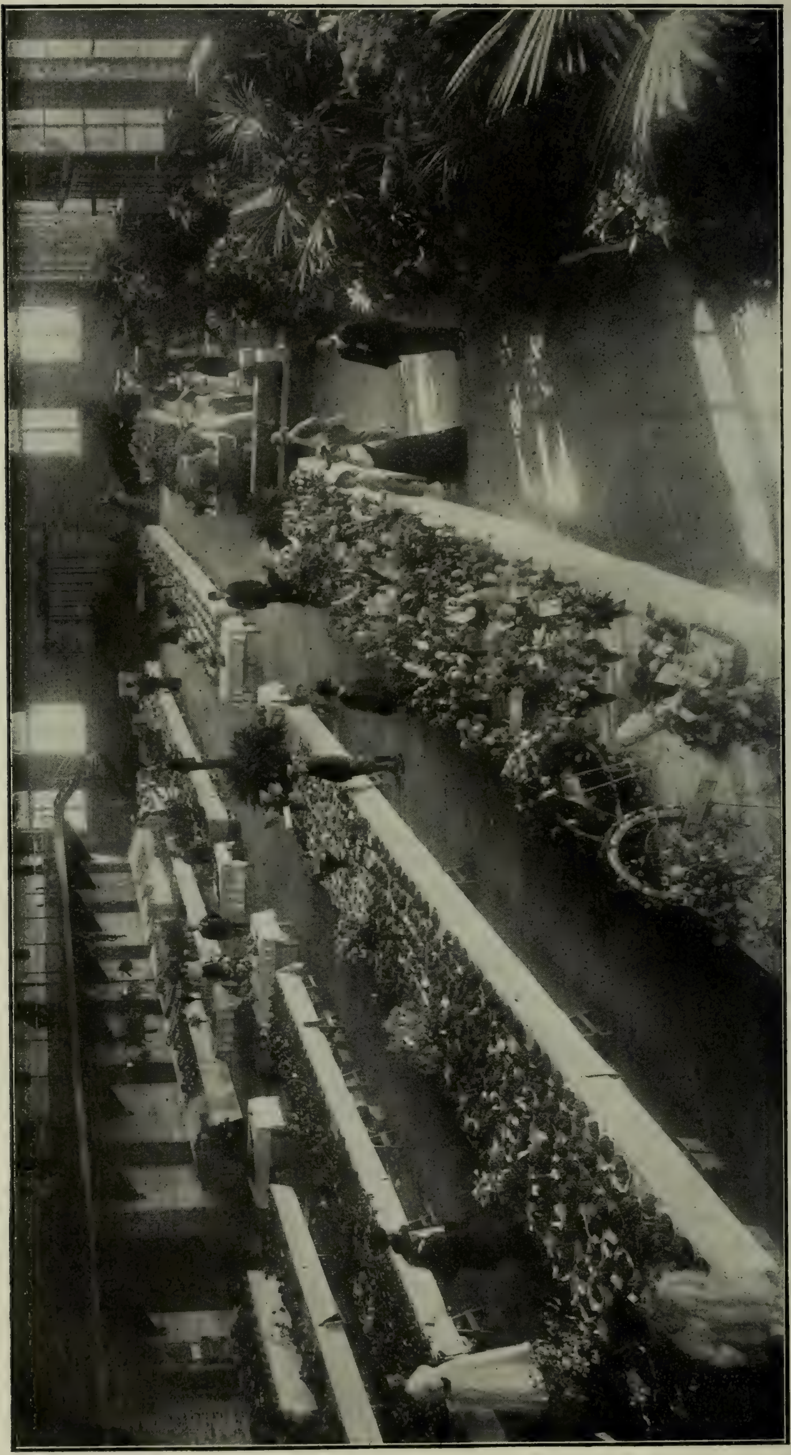
THE WORK OF OUR HORTICULTURAL SOCIETIES.

By J. Lockie Wilson, Toronto.

This is the first time that I have had the opportunity of meeting the representatives of the Horticultural Societies in this Province, and I can assure you ladies and gentlemen that I am very gratified indeed to be able to greet you to-day, assembled as you are to talk over the important interests that you are representing. Your's is one of Ontario's most progressive institutions.

You have come to this Convention to discuss the problems that confront our Horticultural Societies. No mere mercenary motives have drawn you from the four winds at considerable expenditure of time and money to attend this meeting. It is to gratify your love of the beautiful in nature, and to signify your willingness to do your part towards making this earth more beautiful, attractive and productive that you are here to-day. I trust that our meeting may be helpful and encouraging to every horticulturist, and that all, as a result, may have higher ideals and go home more than ever in love with horticulture and that this may prove an epoch-marking meeting for our societies in Ontario.

The man who makes his thousands at a single deal in real estate, who has added nothing intrinsically to the value of the land, may, because of his dollars, cut a large swath in the community, but I count of far greater value to the world one who through the study of nature's possibilities brings out an added flower or fruit of value to mankind, and while these dealers in lands, stocks and bonds may laugh in derision at our enthusiasm over a new peach that fills its place in the succession of fruits, or a new chrysanthemum with added attractions of form or color, we can in our ecstasy sorrow a little that so few people of this world know how to get the highest



Niagara District Horticultural Exhibition, St. Catharines, Sept. 18-19, 1907.

pleasure out of life by living near to nature's heart. There is a wonderful field for improvement in the objects with which we deal and the more we add to our knowledge of things that lie nearest to us the wider will open the door to a wealth of information, the acquirement of which will give us the keenest delight.

The horticulturist who does not see more beauty and have a greater source of happiness in a great thought or a lofty conception of the Infinite, as manifested in the marvellous works of nature, than in the gold for which he sells his hard earned fruit, has failed in the highest purpose of life.

The richest and most practical horticulturist is he who not only intelligently and successfully cultivates his own gardens and orchards and enjoys the comforts of his well earned prosperity, but, through the broad scope of his intellectual and spiritual vision, sees the marvellous forces and laws of the Infinite as they are shown forth in the countless forms of animals and plants, whether found in his garden as friends or enemies, or in the remotest lands beyond the seas.

The first authentic history of our race refers to a man who dressed and kept a garden. According to the Book, Adam was a horticulturist by Divine order. Infinite wisdom was exercised in the choice of occupation for the highest of God's creatures. Horticulture was chosen as the best pursuit for primitive man, and, though we have departed from many of the ancient customs and discarded many ancient ideas, the dignity of horticulture has never diminished. To-day it ranks higher than ever before, and the progress it has made in every way justifies it to be classed, as we hope it soon will be, among the learned professions. Trace the evolution of the peach, that most delicious of fruit; from the bitter little almond we find descended all the varieties with which we are acquainted. The state of perfection to which the apple has been brought is no less wonderful. Compare the apple of to-day with a crab of some inferior variety and the difference may readily be discerned. We see in our flowers as well as our fruits the fairy touch of science. Contrast the wayside briar with the beautiful roses exhibited at our exhibition in Massey Hall, and you begin to have some idea of what scientific culture has done. While, in reality, horticulture has always borne an important part in the affairs of men, the term has recently been given a broader meaning, and now includes all the arts relating to orchard, vineyard and garden as well as all the pursuits bearing on the adornment and improvement of homes, parks and highways. The horticulturist, as a member of society, is much more important than he was half a century ago. A knowledge of botany, chemistry, entomology, and ornithology is necessary in his profession. The best modes of propagation, prevention and cure of diseases and methods of dealing with destructive insects are among the subjects that claim his attention. The sons and daughters in our loved Canadian homes should be taught to regard Horticulture as a pursuit in which industry is rewarded, talent developed and virtue nurtured. The flower complete in every part, blooming in its proper season, and fruit in its perfection should be a reminder of Him who said "consider the lilies." Every garden, however small it may be, has in it something of Paradise. Whatever helps a life to grow upward into a purer light, a clearer atmosphere, or causes the finer feelings to take root and climb up to a more healthful place is surely worthy of notice and is an inspiration both noble and unselfish.

I am reminded of a quotation printed on the front page of a prize list of the St. Catharines Horticultural Society—that society which is doing such good work in the Garden City under the supervision of our energetic and untiring President. I will read you the quotation, though some of us might not agree with it to the fullest extent, but, in many cases, it would apply: "And he gave it as his opinion, that whosoever could make two ears of corn, or two blades of grass, grow upon a spot of ground where only one grew before, would deserve better of mankind and do more essential service to his country than a whole race of politicians put together."

The work our Horticultural Societies are doing is a noble one. The St. Catharines Society is an outstanding example of what can be done by earnest, honest effort and perseverance. Last year they expended $1,600 in prizes and had a total expenditure for all purposes of $2,500. Their membership roll numbers 450. The surrounding townships have caught the spirit of that energetic citizenship and have contributed large grants to the Horticultural Society. The town itself considered their grant of $350, money well spent.

We have in the Province 63 societies with a membership of nearly 7,000. Under the new Act six other societies found it necessary to become merged with Agricultural Societies; their membership was 540. The total grants to societies in 1906 was $5,956; the grants in 1907 amounted to $8,000.

One important feature of our work should be to spread the good tidings of the great joy that follows in the wake of horticulture. Bankers, doctors, lawyers and manufacturers subscribe for journals specially written for their particular lines of business, and the up-to-date horticulturist must do likewise. How are you to know about the newest kind of fruits, flowers or vegetables, and the proper way to protect them from their enemies, if you do not take a journal that deals in a practical manner with your business? I would recommend every member of our society, if they have not already done so, to subscribe for a horticultural journal. We have *The Canadian Horticulturist*, edited by our secretary, and there are also other valued farm journals that devote a number of pages to the work of the horticulturist.

Fruit, flowers and well kept lawns and ivy-crested homes have a far-reaching effect for the betterment of humanity. Many societies are doing an excellent work in distributing seeds, plants and bulbs to school children. I would suggest that, when seeds are distributed, in this way, the teachers get in touch with the members of their local horticultural society and follow up the work by visiting the homes of the children, showing that interest is being taken in the work that the little ones are doing. Splendid work can be done in the outlying districts and slums of towns and cities. Many of our working people are endeavoring a small way to beautify their humble homes, but they do not go about it in the best possible manner. Many of them try to produce flowers and vegetables where the sub-soil has been turned up from cellars, but success does not follow their efforts and they cannot understand why they fail. If members of horticultural societies would visit the cotters' homes, showing them how to improve their soil, and the best kinds of flowers, plants and vegetables to grow, they would be doing an unselfish work in assisting to obliterate ugliness, and bring joy to humble homes.

We must encourage the local press to take cognizance of the work we are doing, and members of the societies should frequently send items of interest on horticultural topics for publication. Many societies hold monthly meetings at the homes of their members, and have discovered that this method is an effective one for increasing membership and adding interest to the work.

I have to thank you for the kindly and courteous hearing you have given me. I hope that when any of you visit Toronto you will find your way to my office and talk over matters that may arise of importance to your societies, and anything I can do to further the work in which we are engaged will be gladly done. It is encouraging to see so many ladies here and I trust many others will join us in the near future, because they are the ones who know best how to train the tender plants to grow up towards the golden shafts of the sun-beams and they best understand how to care for things that are beautiful and good.

DISCUSSION.

Mr. TEBBS: What is considered the best argument to take to our civic authorities to get from them the biggest grant we can? I quite appreciate the fact that the St. Catharines' Society obtained a grant of $350 from their council. We intend to ask our own town authorities at Hespeler to help us in that direction, and I would be glad to get information along that line. I think it does enhance the value of the city as a whole, particularly in getting strangers to locate there, if the town is looked after in that respect; and, if Mr. Wilson will give us a practical way of broaching the subject to the authorities, I would be glad to hear from him.

Mr. J. LOCKIE WILSON: I think where a Horticultural Society is very active in a town, and doing fairly good work, they should have no difficulty in getting the town fathers to take cognizance of what they are doing. In many of the towns the Horticultural Societies have undertaken to beautify the public buildings, and have put window boxes in town halls and school buildings, and have planted beautiful beds of flowers in the grounds in connection with the town property, and have encouraged city councillors to secure small squares where beds of flowers and shrubbery have been set out and looked after by the local Horticultural Society, and they have encouraged the children to take an interest in those particular plants. It will, I believe, depend a good deal upon the members of the Horticultural Society themselves as to how they can impress the authorities. If the members of a society are improving their own premises and endeavoring to beautify the lawns in front of their homes, I think the city fathers would soon notice the good work that was being done, and very little persuasion would be required to secure any reasonable grant asked for.

Mr. WHYTE: I think we should express our thanks for the admirable report in connection with the last meeting. I think it is a very creditable one indeed.

The PRESIDENT: It depends a great deal upon the members of the Horticultural Society themselves in the work they are doing as to the grant they get from the municipal authorities; and, if it will do any good to know how the St. Catharines Society obtained theirs, I am glad to tell you. Four years ago, when we decided to hold an exhibition, we asked the city council for the modest sum of $50, which was very readily granted. The next year we asked for more, and we had a promise of more; but, when the estimates came to be adopted, they were pared down till we got the same amount—$50. The next year, owing to the fact that we were offering more money in prizes, we asked for $250, which was granted to us without any demur. This year we thought that, as we were enlarging, we ought to have a still larger grant, and we asked for $350. I saw the Chairman of the Finance Committee in the afternoon, and he arranged for a meeting in the evening, and two or three other members of that committee called up the Mayor by telephone, and he asked if $300 would do. I said: "No, we require $350.'' He said he knew of no better way in which the civic money could be expended than in the work of the Horticultural Society; so, when the council met, it was passed unanimously, and the only remarks that were made on the subject were those of two members, who said that the grant ought to be still larger. The members saw that the Horticultural Society was doing a work that they could well afford to assist materially. I think if you ask the members of your councils they will respond to a reasonable request.

Mr. Cowan: If our societies can increase their funds by grants from their town councils, it will be of great advantage to the work. There is one point which has not been touched upon, and that is, when you go for a grant do not go begging, but go as if it were your right. State that you are doing a good work, that you want a grant, and expect them to give it. If you can get the editors of your local papers interested, it will be a great help. Fortunately, most of the societies have the local editor right with them. As Mr. Wilson intimated, it is well to get your line of work prepared beforehand, and, if you can show the council that your society is of benefit to the town, you are almost sure to get the grant.

The subject of interesting the school children is something that commends itself to the members of the council and societies doing that kind of work stand a very good chance of getting the grant they ask for.

Mr. Guilfoyle: Can you tell us about the larger amounts of your expenditure—what lines of work you spend your money in?

The President: Our largest item was for prizes. What we paid this year would not be less than $1,300 or $1,400, perhaps more. For seeds, bulbs and plants our expenditure would be about $350 to $400, and for periodicals about $120. I think those are about the largest items. Our total expenditure would be over $2,500.

Major Snelgrove: In reference to this question of municipal grants, I would like to call the attention of the Superintendent to the unfair law in the Municipal Act. I discovered it a few years ago. Being in touch with our City Council in Durham I found that they were preparing a by-law which had the effect of granting, I think, the sum of $100 to every Agricultural Society in the United Counties. They were enabled to do this under the Municipal Act. I got one or two of the councillors representing the towns in our united counties to interest themselves in it, and we succeeded in getting them to place a similar grant for the Horticultural Societies at Cobourg, Bowmanville, Port Hope, and Millbrook; but, when the by-law came before the council, they discovered that they were under no compulsion to give the Horticultural Societies the same financial assistance that they were giving the Agricultural ones. Now, I certainly think that the citizens resident in the towns and villages of our counties are equally entitled to have a distribution of municipal money, if the council see fit to grant it, and I would ask Mr. Wilson to look into the matter and see if the Act can be altered in such a way that we can go to the city council and say: "You are giving our rural friends $100 in every township. We ask you to give the same amount to the Horticultural Societies in our towns."

Mr. J. Lockie Wilson: The powers of councils are fairly large in that connection, and as such grants are for the people—it is the people's money they are handling, and the people are getting it back—unless there are some cranks in the community, there should be no difficulty. I think a municipal council would be justified in granting you any reasonable amount.

The **President**: I did not think there was any restriction in the powers of municipal councils to make grants to Horticultural Societies. In addition to the grant from our city council we received one of $175 from the County of Welland, and $35 from the township council of Grantham. So, you see, on both sides of the city the townships made us grants as well as the city council, representing the whole constituency; and there was no word of opposition in any way.

HOW ARE WE TO EXPEND OUR FUNDS TO THE BEST ADVANTAGE?

By Rev. A. H. Scott, M.A., Perth.

I have a friend who has riches and a garden. He says that he hopes those who come after him will take as much pleasure in spending his money as he takes in making it. Other people may be right or they may be wrong, but they say that Mr. ——— grudges the expenditure of a dollar unless he can see how it will make another. The only reservation in this dollar outgo is the expenditure for the upkeep and embellishment of his garden. My friend may have his own purposes in finance, but I know this to his credit, he is seized of the horticultural idea.

To the horticultural idea belongs, necessarily, some right conception of money. In our fair Ontario the right expenditure of smaller or larger sums of money at the present time, for the purpose of soil and garden development counts for a great deal. "A dollar in a University is worth more than a dollar in a jail." Since cultivated mankind from time immemorial has shown an hereditary tendency for the soil, and inasmuch as "to own, to till, and to beautify a bit of land, no matter how humble, is the absorbing desire of most men of moral breadth," it is important that an Association such as ours, and operating at a time and place such as this, should encourage a sane and generous expenditure of such moneys as may be within range of our influence and advocacy. When so many places in the Province, to go no farther just now than our own boundaries, are susceptible to the chaste touch of horticulture, it would be a sin to shut up money where it breeds worms. It is better to give the dollar plenty of air that our people may get from it the sweetness of the hawthorn.

How to expend to the best advantage the funds at the disposal of horticulture in Ontario is a subject which as it appears to me, no one person should assume to treat exhaustively. We know in part. Conditions vary. Some of our money is in local treasuries. Some of it is in the hands of the Government. Some of it is in private hands, ready for use when friends of the garden and appreciators of the soil shall have influence sufficient to open the doors for a larger knowledge of nature's operations. But if we are disposed to listen to what others have done, and if others will think well of our well meant endeavors; moreover, if with good judgment and high purpose a growing number of us will suggest, and follow up suggestion with patient persistent endeavor, there is no reason why this favored Province, in this western world, should not soon be a great deal more like a well kept garden than it is to-day.

Let me proceed through a concrete instance. The Horticultural Society of which I am a member is desirous of being a helper in the horticultural

Flowers that bloom in the Spring.

cause in Canada. You know of that phase in our make-up which disposes us to think well of our own. Now in my spot in Ontario we have a pride in clean streets. We glory in overhanging shade trees. We advocate well-kept lawns and good gardens. About our premises in summer you may notice the product of intelligent cultivation, and, if you visit us in the winter, we will show you something that is rewarding in indoor culture. A part of our pleasure is the result, I believe, of a certain expenditure for the bulbs and shrubs that reach us through the Perth Horticultural Society.

It soon became impressed upon our members that they were scarcely justifying their horticultural existence by confining their attention to the cultivation of those niceties which were largely for their own personal or household use. So they looked about and asked what more they could do. Their attention was fixed upon the places where many pioneers in the Perth district were sleeping. A new piece of land had been purchased for a general cemetery, and when the community began to bury its dead in the large place the old grounds came to be neglected. Prompted no doubt in some measure by attachment to Him through whose grace and power the dead are to rise again, in some measure too, out of respect for the memory of the departed, and in a great measure by that sense of propriety which is shocked to see the stone wall of a sacred place broken down and mounds that should be putting forth green grass grown over with nettles, our society contributed out of its own funds and added to these through personal solicitation among the townspeople, with the result that the old burial grounds belonging to the Presbyterians, Anglicans, Methodists and Roman Catholics have been made new. Perhaps no expenditure has given more satisfaction to our members and to our citizens than this upon God's Acre.

Some of the funds belonging to our society have been expended in various ways along the line of civic improvement. Ornamentation of public buildings with blooming boxes and hanging baskets has been done. The society has helped to prepare the way for beautifying the grounds about the place which is conspicuous when we are leaving our homes and returning to them again at the season of travel. Our most recent service was one in which we were associated and assisted by one of the Departments of the Dominion Government. A water-way leads from our town to the Rideau, which again opens on the one side to the St. Lawrence River and on the other to the Ottawa. The basin at our end is the head of navigation. The banks were unkempt. But, now, the Government of Canada and the Perth Horticultural Society having joined hands in the enterprise, there is a new order of things since the banks of the Tay were subjected to the skill and culture of the landscape decorator.

These are sample instances of what has been done in a single place. Expenditures for kindred purposes in places where other conditions obtain would seem to be to the advantage of the localities, and in keeping with the right trend of horticultural society endeavor.

Taking a wider outlook it appears to me that doors are presented to us in the three following directions:—

(1) We should be free to spend money to bring in men and women who are capable of making the public platform a disseminating place for healthy horticultural information. L. H. Bailey tells of an owner of land, who, not knowing reasons for anything, has no inspiration and goes fishing. The fisherman's calling is time honored and respecting, but it is too bad inasmuch as right gardening is intellectual employment, that so many fine acres should be locked up because so many operators on the soil are uninitiated and uninformed. There is a power in the living voice of an interested personality who

will provoke enquiries from the platform and send audiences away with a new charm for "the most beautiful, the most healthful, the most useful and most noble employment of man."

(2) There was never a time in the history of Canada when there was so significant a call to furnish our people with reliable and inspiring horticultural matter through the printed page as that which we have come upon just now. The intelligence of the Canadian, I believe, forbids the success of any venture in publication that is characterized by what is scrappy or second-hand. There is a great deal that is hopeful in the tone and talent which we read through some of our Canadian journals that devote themselves wholly or partially to the agricultural or horticultural cause. May these broaden and prosper: I, for one, have great expectations for our *Canadian Horticulturist*. All honor to those in the earlier days who brought it up to what it is to-day. But from this on everything should be done that lies in the power of our officials and membership to enlarge its constituency, to brighten its articles, to fortify its editors, and furnish for our people in this portion of the world the ripest and the best in horticulture. We want this magazine to be first in its line, and I believe we have the conditions in Canada of making it that.

(3) At the risk of being less definite than I should like to be in this concluding reference, I take advantage of this opportunity to express my own concern as well as the concern of other thoughtful men, if the present school books of the Province are to be changed, that the new ones should have a conspicuous place for the first enterprise of the nation. Military training in the public schools in the Maritime Provinces is spoken of as part of a plan about to be executed. If in the Maritime Provinces why not in all the Provinces? If the boys and girls in Nova Scotia are to have special instruction in the science of killing men, let Ontario and the sister Provinces on to the Pacific Ocean be made proficient in it as well, the prayer going up all the while that we may never be called upon to put it into exercise. But next to the work of saving man's souls in Canada, I can conceive of no more important work to be done during this generation than the training of our children into appreciation of the Creator's gift in the soil, and in the best use of that gift, both for the development of a sturdy Canadian manhood, and for the enlightened projection of our country's chief resource. We receive from the Government of the Province a part of our wherewith for promoting the horticultural cause. We look for the utilization of some of the moneys contributed by the Province to the Ontario exchequer in laying new and improved foundations with our sons and daughters by means of the very best procurable lessons in the new series. It may be too early to go into detail. But if a forecast would be pertinent it may not be inopportune to write here the expectation that when the new series of readers for the public schools of this Province shall have taken the place of those which have served their day, there will be afforded scope for the definite and rewarding consideration of such fundamentals in the soil as drainage and tillage, as clover and fertilizer; and that the right association will be set forth for our twentieth century citizenship in this Canadian realm between a bed of asparagus and health, between a perennial border and happiness, between the "chief end of man" and a "watered garden."

DISCUSSION.

Mr. J. S. PEARCE: One thing Mr. Scott referred to is, in my mind, a most prominent thing, and that is the improvement of cemeteries. I think the Horticultural Societies could take up that work and do great good. It is deplorable to see the cemeteries as they are to-day, not only through the country, but also in the cities and towns. This society should endeavor to get up some scheme to improve the general appearance of the cemeteries, and not only clean them up but plant them. There are very few cemeteries in this country that are well planted. I would like you, if you ever go to Chicago, to visit Graceland Cemetery there. It is an object lesson to anyone who knows anything about planting. It is done so thoroughly that you would not know you were in a cemetery, because the monuments and stones are not prominent. My idea is that you do not want to see the stones, but something outside of that. In a great many cemeteries you see stones and very few flowers, and what you want is to get a man who would give you some general ideas. For a cemetery of any size there should be a planting plan so that the work could go on from year to year.

Then Mr. Scott spoke of speakers for Horticultural Societies—that is an admirable thing. The local societies could have a series of lectures through the winter amongst themselves. It is not absolutely necessary to get outside men. You could get plenty of men to talk on these subjects and give a little discussion, and the people in the audience should ask questions, just as here, the members should ask them, and, if the speaker cannot answer them, somebody else can.

Horticultural magazines are another very important thing and I got my experience from reading them My father was very generous to his family in supplying them with magazines, and that is where I got my inspiration, and I hope you will go home and induce everyone to take a good one. Then as to school books. That is a very important matter. I am not sufficiently familiar with that matter to discuss it, but I would say that this Association should not go home until it has expressed its opinion on this subject.

Now, the work of the Horticultural Societies should be as educational as possible. If that is done, you will find the work becoming more interesting. In my experience in park work in the City of London, I find that, if I make the park interesting educationally, the people will come and ask me questions. You have no idea what an interest you can awaken along that line.

The question of seeds for schools has been pretty well discussed and I need not refer to it. You cannot have too many flower shows. Every society should have one or two or more. I would suggest having a flower show for the school children. If you cannot have a special one, have one in connection with your own regular show, and by getting the children interested you can get the parents interested. I will give you an illustration of how that worked out. In the fall of the year when I have taken up all I require in Victoria Park, in London, the children come and I give them a plant each, or perhaps two; there is not one in ten that amounts to much when they get them home but it interests the children, and mothers with babies in their arms come and ask for plants.

Mr. W. T. Macoun: I am very much pleased indeed with Mr. Scott's paper. I had the pleasure of attending a meeting of the Horticultural Societies last spring and enjoyed it very much indeed. Mr. Scott is a very enthusiastic worker and has done much to help Horticulture.

There is one point Mr. Wilson brought up upon which I should like to say a few words. That is in regard to the expenditure of money for the poor people of our towns and cities. The wealthy have fairly good houses with some architectural beauty and nice lawns in front of their houses, and, on the whole, our streets all over the country are fairly respectable. But, if you go into the poor parts of our towns and cities, the parts where the laboring classes live, those men who have to work long hours and have little time to attend to their places, not much is done, not altogether from lack of desire, but from lack of opportunity. When we contrast the laboring classes in this country with those in England—that is in regard to the appearance of the houses, the contrast is very marked indeed. Any of you who have visited the Old Country cannot but help remembering the beautiful appearance of the cotters' gardens all over the land. They are simply bowers of vines and overflowing with flowers that are a great credit to them, and we find in Ottawa that quite a large number of the poor people who are gardening are from the Old Country. Now, if we can make our citizens a little more enthusiastic I think it would be a great thing indeed.

I have been thinking over a number of schemes lately for the work of the Horticultural Society in Ottawa, and one of the best ways in which we can help the poor people, and improve the city as well is to plant in large numbers. Beginning with a vine, order, say, five or six hundred vines, which we could get for a very few cents each; Virginia Creepers or climbing bitter-sweet could be got for a few cents each by the hundred. We distribute those to the people, giving every man on the street one of these vines. There is nothing so easy to get started as a vine. It is out of the way of the children and dogs, and gets well established as years go by till, in two or three years, those houses will be completely changed. Poor people's houses, as a rule, have no architectural beauty whatever, and, by judicious planting of these vines, not only will they improve the appearance of the house, but will give them shade as well. Those of us who have larger houses have a wide verandah to sit out on, but the poor citizens have to sit on the shady side of the house, or, if they have a verandah, it is a very small one. If we were to give them these vines, they would both keep the houses cool and give them plenty of shade as well.

Get the Honeysuckle, which you can buy for a few cents each, and distribute them to the people, and it won't cost the Society much. That is my idea for helping the poor—giving them something which will be a permanent thing. We have spent too much on seeds and bulbs which are of only temporary value.

Mr. Gammage: Mr. Scott's able paper covers the ground so thoroughly that we can hardly grasp the whole at one time. He has touched upon the subject so thoroughly from an economic standpoint as well as a sentimental one. The idea of what he has told us regarding the children is one that we should take well to mind and try to inculcate into the minds of our Horticultural Societies and our boards of directors. Speakers will tell us of the great opportunities that there are in Canada; of the unlimited wheat fields we have; of our great mineral wealth and manufacturing resources, and in our schools the arts and sciences are taught, as well as manual training and domestic science, but we find very little has been done in the past towards horticulture. I am very pleased to note that recently the Minister of Agriculture has offered an increased salary to school teachers in rural districts who will take up horticulture and teach it. He is offering a premium of $50 a year. Horticulture from an economic standpoint will be of great advantage to the coming generation. If they teach manual training, and boys are able to know how to manufacture or to repair, why should they not be taught how to grow vegetables and fruits for their own sustenance?

The Society of American Florists, at their annual meeting passed a resolution to the effect that they request their legislators to make the teaching of agriculture compulsory in the schools. I believe a resolution from this Association to that effect, to the Minister of Agriculture in Ontario would be a good idea. We cannot too strongly endorse the work that the Agricultural College and Experimental Farms are doing, yet they do not cover the ground as thoroughly as it ought to be done, because their work is limited to a few. Already we can see the benefit of their work in the different ways the farms are kept. The system has been instilled into the students. Those students continue to advance and they have a system of farming far ahead of that practiced by their fathers; and, if something along this line were taught in our public schools, I think it would be a great advantage.

Mr. Whyte: In reference to what Mr. Gammage said, and Mr. Scott's paper, I would like to emphasize one or two points. In regard to speakers, I think he has not over-estimated the importance of having good speakers to address the societies—that is, those who really know from their own experience what they are going to talk about. It is not always necessary to bring speakers from a distance, but I would strongly advise all the local societies to arrange for the subjects they want to discuss next winter, and let the member who takes up that work devote his time to that one question. Supposing he takes up a single flower, let him study that one flower so that he will have some definite thing to tell you. There is not a society in the country that has not a dozen members that are quite capable of undertaking work of that kind. By doing that, you will have definite information—a record for all time to come, and there is no end to the good that every Horticultural Society could do, no matter how small it is.

In regard to horticultural literature; that is a very important point, which our societies should encourage. I do not know of any money that is better spent than in distributing to each member horticultural literature, not only our own "*Horticulturist,*" but, if our funds will allow, we might add others.

I have very great faith in the value of a well considered premium list to members. There are a great many people who know nothing about flowers or plants; they join a Horticultural Society and it is a great consolation that they get something that is of some value, and it is very important to give them all the options you can. I do not think it is a wise thing for a society to give a premium and say you have to take this or that; give them an option. The St. Catharines' Society carry that to a greater extent than any other. They have twenty-seven options and you can take any one of them. If you have a member who has not a garden, who has only a house to grow something in, and you give him a flower that has to be grown outside, it is of no use to him.

Mr. Short: It has occurred to me that in the expenditure of funds, a certain amount should be set aside by each society to pay the expenses of at least one delegate to these meetings. I suggest to Mr. Wilson that on the list of officers provision be made for one delegate. With the beautiful show going on in Massey Hall the atmosphere in Toronto is decidedly Horticultural, and I think it would be an immense benefit to every one to attend it: we would go home to our own Association broadened out and improved and our knowledge widened and we might, perhaps, impart a little of that knowledge to those of our members who have not the privilege of being here, and I think it would be money well spent if each society would send a delegate here. From the number present in the room here to-day it would appear that only half of the societies in the Province are represented, and I think that is to be regretted.

It was then moved by Mr. J. Cavers, seconded by Mr. Gammage, that a special committee composed of Rev. Mr. Scott, Mr. W. B. Burgoyne, and Mr. J. S. Pearce, be and is hereby appointed to draft a resolution recommending the Ontario Government to have embodied in the proposed new series of school books, readings bearing on Horticultural topics, as suggested by Rev. Mr. Scott, in his paper, the committee to report to-morrow. Carried.

WHAT CAN HORTICULTURAL SOCIETIES DO TO PROMOTE CIVIC IMPROVEMENT?

By Major W. J. Snelgrove, M.A., Ph. B., Cobourg.

To this query, my answer is: By arousing and uniting all citizens to develop beautiful and wholesome surroundings.

By raising the standard of municipal taste and tidiness. By materially contributing towards making our home life brighter, healthier, and happier.

To do these things by means of organization which we have at hand, working out its salvation by dint of patience, stick-to-itiveness and common sense.

I submit that the prime object of our Horticultural Societies should not be merely to cultivate a love of flowers *per se* by the distribution among the members once or twice a year of seeds, plants, bulbs, shrubs and trees, but our constant aim should be to educate public sentiment along lines of civic improvement, and thereby achieve "the greatest good of the greatest number."

" Sidbrook," residence of W. L. Abbott, Cobourg, Ont.

View looking south toward Lake Ontario. Note the magnificent bank of flowering shrubbery.

Can we not in most cases furnish the initiative, the motor power, "the push and the pull" behind the throne, by suggesting reforms in some department of civic administration, resulting inevitably in the creation of a public sentiment that will either impel or compel our municipal authorities to do things which hitherto have been utterly neglected or sadly misunderstood in the average urban community.

Perhaps some one will ask, what is the meaning of civic improvement? It is a recognition of the rights of the people to the free and unobstructed enjoyment of the natural beauties bestowed upon us by a beneficient Creator. It is a war against ugliness everywhere.

In our national life we are at the turning of the ways. We have commenced to think of living, but how can we live happily amidst an environment of ugliness, the defacement of nature, loathsome home surroundings and dearth of rational recreation—the products of sordid commercialism.

We must reorganize our civic life in harmony with that democratic interpretation given by John Ruskin when he said that the exterior of our houses is not private property, unless we build in a wilderness.

Our mission should be to create a conviction of the beautiful along the highways and the byways of our modern Canadian life, and to unite private individuals, voluntary associations and industrial corporations in the outward expression of this conviction.

Public beauty is the dominating idea of the twentieth century.

The "Town Beautiful" is no longer a dream of the idealist, but in many places it is becoming an accomplished fact. Wherever one travels, whether by railroad, boat or carriage, we cannot fail to be struck with a remarkable tendency everywhere towards embellishment. Beauty and art in the truest sense are no longer reserved for the rich few—are no longer the perquisite of luxury-loving aristocrats, but are made the common heritage of the common people, for the benefit and uplift of all.

Throughout the American continent we find gentlemen possessing the ability of statesmen devoting themselves unselfishly to the pursuit of citizen-making and city-making, strenuously striving to prepare the people for improving their present conditions and planning a model city for the future.

It is the awaking of a general civic consciousness which means the redemption of our communities from the sordid and the shabby.

To exile ugliness and enthrone beauty is our common interest.

Let us as civic workers keep up the struggle until Canada can boast of a hundred cities with the beauty that was ancient Greece's and the grandeur that was ancient Rome's.

May I describe some methods of conducting a civic improvement campaign which have been efficiently carried out by the Cobourg Horticultural Society.

At the annual meeting held in January a publicity committee and a look-out committee are appointed. The duty of the former is to contribute paragraphs to the columns of the local newspapers, offering suggestions touching every feature of the development of the æsthetic and civic side of town life and showing that the character of the community is formed by the surroundings which even the humblest citizen maintains about the threshold of his home; also illustrating from time to time how efforts to beautify will induce every tenant in the block to follow suit. People who will allow weeds to grow luxuriantly about their premises are occasionally "written up" as a sort of "horrible example." The effect of this publicity is often magical.

The town is divided into wards or districts which are assigned for purposes of observation to the different members of the look-out committee. For two or three months this committee goes about quietly taking note of all eyesores and offenses against the sense of sight, and also noting how much better the town would look if certain improvements were made with the common property of the municipality. In the spring a meeting of the committee is held, at which notes are compared by the members and a report prepared for transmission to the town council. Through the Chairman, the Mayor is requested to call a special meeting of the council, when a typewritten report of the committee is presented and discussed clause by clause. A committee of the council is then appointed to co-operate with the directors of the society in carrying out as far as possible the recommendations of the look-out committee, which are handed out to the local press for publication. The effect is marvellous, the natural impulse for civic improvement manifesting itself in a general attempt to clean up and fix up throughout the town.

In appointing civic improvement committees, we should endeavor to avoid misfits. I mean by that merely ornamental members with only names, who do nothing, and are not worth a cent to the work-a-day purpose of any live association. And it may be said by way of parenthesis, that even a well selected committee, with a sincere desire to do things, rarely gets anywhere unless the chairman has the gift of initiative. Someone has said that all the world's great prizes go to initiative, that is the faculty of seeing for one's self what should be done, and of doing it without ado. Usually an entire committee or a whole society hold back, waiting for the man or the woman with the initiative to point the way. At least that has been our experience at Cobourg.

You have heard the story of the Sunday School teacher, who, quoted the words of the Bible beginning "many are called," and asked the class to repeat the remainder of the text. Only one hand went up, and the precocious child was told to give the class the benefit of his Biblical lore; "Many are called but few get up," was little Johnny's revised version of the Scriptural proverb, which is lamentably applicable to the work of our societies to-day.

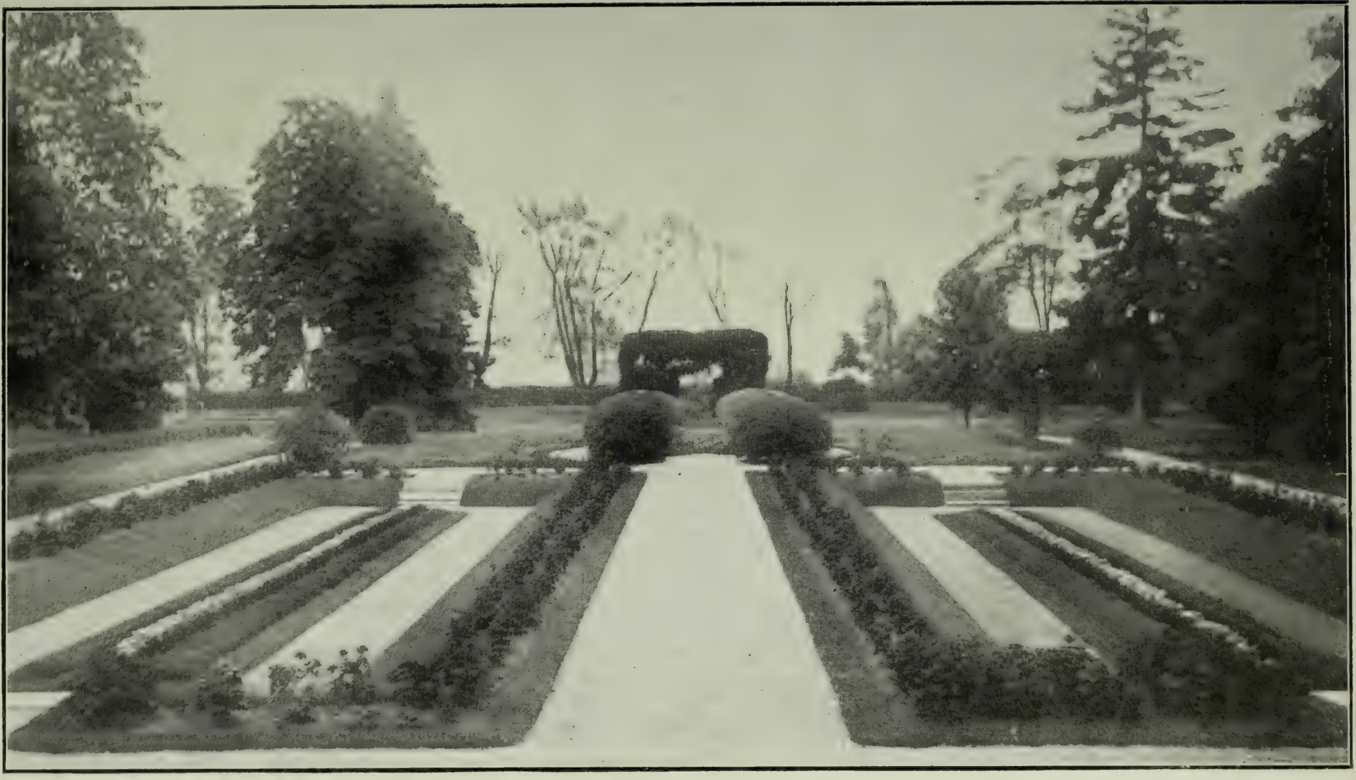
Unquestionably the most prominent single factor in the movement is the influence of our women, God bless them! They are our good housekeepers, and what is more proper than that they should become good civic housekeepers? They abate nuisances in the household. Why not in the town? They make the home a place of beauty. Why not the town? Moreover, patience and perseverance more frequently characterize their efforts than those of men. This is the coin of success. The work that never lags is woman's work.

Yet there is no dearth of opportunity in any city, town or village of this Province. It is intelligent consecration and application that tells every time.

In undertaking this work, we should not undertake to remake the town in one year. We do not purpose meddling officiously with the work of our municipal bodies or offensively dictate to them what they should or should not do. Appreciating their responsibility, we approach them deferentially, and politely offer to co-operate with them for the good of all. Every town official who has an eye single for the public good should certainly welcome the co-operation and co-relation of our influential societies for bettering municipal conditions.

The making of the ideal modern town is essentially and unpolitically a business proposition, wherein the health and happiness of each citizen is considered a tangible asset equally with the annual tax bill; where the costly ruinous regime of the incompetent, self-seeking politician is ostracized; and where public service as an honor and a duty, is cheerfully assumed by the ablest and best citizens.

If, as has been suggested in Chicago, art is a corrective for crime, then art should be made effective as a preventive of crime. Educators are begin-



“Hamilton House” gardens; residence of Mrs. Tracey, Cobourg, Ont.

In 1860 “Hamilton House” was the residence of Hon. Sidney Smith, Postmaster General, when King Edward VII. (then H.R.H. Prince of Wales) during his tour of Canada visited Cobourg, making his headquarters at this beautiful manor house. The work of the landscape gardener was laid out prior to the Royal visit. It has been improved with the lapse of years, but the design has not been changed.

ning to see that the sphere of the state embraces not only the redemption of those who have fallen from grace, but equally the prevention of those walking in the paths of virtue from falling out by the wayside and becoming moral castaways. "An ounce of prevention is worth a pound of cure." As a consequence, we rejoice to find that our school houses are becoming more and more the centres of refinement for those who enter their walls. The school house should be made a real civic centre of the community and a perennial source of hopeful uplift to all classes. Unkept school grounds leave bad impressions on children, which in later life will surely be reproduced in their homes and work-a-day surroundings. There is no doubt that the refining influence of school gardens takes out of boys the tendency to pilfer fruits and flowers. Each child feels that he has a personal stake in some living, growing thing. It implants in his young, fresh, impressionable mind a love of the beautiful. The public schools, wherein most of our future electors and legislators are being made "fit" for the responsible duties of citizenship, are the place to which we should turn our attention in our efforts to promote a more beautiful public life in Canada. "If the Athenians desire good citizens, let them put whatever is good into the lives of their children," was the advice of a great philosopher in ancient Greece, which we ought to take to heart to-day.

Here are a few concrete objects our society should work for, as distinguished from more general civic ideas, viz.:

Preservation of the natural beauty spots.

Removal of unsightly bill-boards, poles, overhead wires, and signs lining the streets and making hideous the town's principal avenues.

Object lessons on how to plant the home grounds, showing the importance of a right start, etc.

Offering prizes for the best porch window and garden display.

A relentless war against dirty, garbage-strewn streets and vacant weed-grown lots.

Insistence that all parks, squares, and public grounds be kept in exemplary good taste, thereby stamping the character of the community.

Bringing influence to bear so as to make the railway station grounds tidy and attractive. First impressions are usually lasting ones, and unfavorable impressions only can be formed by uncouth conditions about a town's main gateway. A pretty station with flowers and vines will afford pleasure, to every resident, every visitor, and every traveller who passes that way.

Enough perennials and bedding plants to embellish scores of small gardens in our smaller towns are thrown away every year by professional gardeners on a large scale. It would be a good plan for our societies to request these florists with an embarrassment of riches to save their surplus plants for the benefit of schools, etc., who would be only too glad to send and get them.

I fear my address has already transgressed in length the bounds of time set for it, but I cannot conclude without giving you a final summing up and enforcement of my argument, which I take special pride and pleasure in doing in the clear, cogent and concise language of Mr. J. Horace McFarland, the distinguished President of the American Civic Association, whose eloquence of voice and elegance of pen have accomplished wonders for "a more beautiful America."

Having written to Mr. McFarland informing him that I had been invited to prepare this address, and asking him for suggestions that would help to inaugurate a great civic awakening in this Province along the lines adopted by the Horticultural Societies in Massachusetts, Rhode Island, Minnesota, Philadelphia and other parts of the United States, I had the honor to receive the following reply:—

HARRISBURG, Pa., September 19, 1907.

MR. H. J. SNELGROVE,
Cobourg, Ontario, Can.

DEAR SIR,—In respect to the subject of your address, I may say that it seems to me that the Horticultural Associations and Societies throughout the Province of Ontario can very profitably take up civic improvement for many reasons, among which might be cited the following:—

(1) These Associations are, as I understand it, made up of those interested in horticultural pursuits, both in a business way and by amateur interests. To the prosperity of the horticultural trades civic improvement directly tends, for aside from the mere physical and decent cleaning up which precedes adornment, most of the adornment is connected with the use of seeds, plants, trees and vines. There is, therefore, a good business reason, if such were necessary, for the interest of horticulturists in civic improvement. The amateur in horticulture has the best opportunity to be a good civic improver, because he has knowledge of the materials which help to make the surroundings of his home and his home town more beautiful.

(2) It would seem to me that these associations, interested in the prosperity of bustling, active Ontario, would have reason to undertake civic improvement work, because such work always increases values. A significant commentary upon this side of the case is presented in a paper which the chief engineer of the maintenance of way of the Pennsylvania Railroad has prepared for presentation at the Providence meeting in November. He calls attention to the fact that improvements instituted by that company at suburban stations have uniformly resulted in a greater business at that station, and therefore have paid the railroad. He points out that those looking for homes are attracted by pleasant surroundings and repelled by ugly surroundings, and that, therefore, the prosperity of the community is directly connected with its relation to the improvement movement.

(3) It would seem to me that the horticultural associations might be interested in civic improvement also because of the way in which improvement conditions tend to satisfaction and permanence in the matter of industrial workmen. It is no longer considered sufficient to pay the current wage and then depend upon adjustment to keep workmen contented. On the contrary, some of the most successful manufacturers realize the importance of providing pleasing surroundings, healthful recreation and proper playground facilities for the workmen and their families in a self-respecting way, to keep these workmen sober, happy and contented. It has been aptly said that parks are cheaper than policemen, and that play grounds for the children cost less than houses of correction.

(4) From the standpoint of real interest in the growing prosperity of Ontario towns improvement movements may be considered most efficiently. Take, for instance, the way in which the child life is helped by improved surroundings. The education of children proceeds through the eye. Ugly surroundings give an education in ugliness; beautiful surroundings give an education in beauty. No one would for one moment suggest that the better citizens grew out of the education in ill-looking, evil smelling surroundings. Yet this point has been lost sight of all over our great continent, and we let our children grow in pig-pen conditions, wondering after awhile why they do not appreciate healthful and beautiful conditions as fully as they ought to. I am sure that I am within the facts when I say that it will pay any community to surround its children with clean beauty, to cause them to hate ugliness.

(5) In making a final suggestion to your associations, it would be that the members resolve themselves into units for work, beginning with that work about the home, proceeding from the home to the street, which ought to be made harmoniously beautiful, and from the street to the town, which should be made attractive and healthful, and which should, in its community government, provide means for recreation and pleasure as a part of its return from taxation. When these units have thus acted they will be ready to fight against the ugliness of bill-boards, the correction of poles and wires, the mutilation of trees and the other ways in which so-called enterprise

has turned our beautiful America in some portions into a most unbeautiful condition. These same units, then proceeding, will insist upon pleasant surroundings for school grounds, so that the children will not have to live through the years of their education in unsatisfactory and sometimes unsanitary conditions. They will want all public buildings to be sightly and well placed and surrounded by grass and trees; they will want better plans for cities, giving open space at frequent intervals, such as may now be learned of in connection with many model communities; they will insist upon proper sewerage and pure water; upon the gathering up and disposal of the wastes of life, both by individual and community action; and in every way as they become conscious of the benefits of good citizenship, will aid in making the town beautiful and the country beautiful. They will have good pavements on the street because they will find these pavements pay. Between the towns there will be good roads, because these roads are not only satisfactory to the eye but profitable to the pocket.

I have the greatest faith in the future of Ontario, and I sincerely trust your address may be an inspiring one, with the greatest benefit to the earnest people who will hear you.

Your truly,

(Signed) J. HORACE MCFARLAND,
President A.C.A.

Let us propagate this beautiful cult, like those torches of which the Latin poet speaks which passed from hand to hand until the whole land was aflame with light.

Let me say further that the reason we have found it far better to have a special meeting of the town council, is because if the report of the committee is submitted at a regular meeting, there is so much other business before the council that, as a rule, they have not time to devote to the consideration of the report, and perhaps it is laid over to another meeting and the same results are not attained. If you ask the Mayor to call a special meeting he will be only too glad to do so, and then the whole time of that meeting is given up to the subject.

We find it very much better to have the report typewritten and have a number of reports—one for each member, and one for the members of the press—so that not only the report but the discussion and the debate on it are fully reported.

When it got abroad that the Society had scouts out, taking notes of untidy places in the town, some of the property owners felt so ashamed and so anxious to redeem themselves that they immediately "got busy" and cleaned up their premises. In our town we have a large Government institution, an asylum for the senile insane. It was no fault of the management that the grounds surrounding that institution were not at all up to the mark, and in our report we drew attention to that fact. The result was that the Superintendent, who is a very tasty man himself, sent a report to the Department at Toronto asking them to give money enough to plant out the grounds properly: so, you see, even Queen's Park needs a few civic improvers up there. Now the town of Cobourg has become the summer resort for some very wealthy Americans. We have nine or ten multi-millionaires, and they have some beautiful landscape gardens. Some contained beautiful shrubs—rose bushes which had been imported by the former owners, from England, at a considerable expense. I, myself saw great waggon loads of these shrubs and trees thrown over the fences, and afterwards put to the flames; whereas, if they had been properly distributed throughout the town they would have been things of life and beauty.

DISCUSSION.

REV. P. C. L. HARRIS, GUELPH: It will be utterly impossible for me to undertake the discussion on this paper, for the simple reason that it is certainly exceedingly exhaustive, and was not prepared inside of a day. I only wish I had had an opportunity of reading it over prior to the meeting this afternoon. I think that the wide scope of points taken up in that paper makes it a very important offering to the work of the Horticultural Societies of our Province in connection with the work of civic improvement. I think the quotation the writer made from Ruskin is one of the strongest features, that "the outside of a man's house is not that man's private property."

I went into a city that is very beautiful for situation, about four or five years ago, and in walking about the streets I came to a very tumbled down shop adjoining a man's house, which I subsequently found was owned by the Mayor of the city; and I believe that to this day the appearance of that property is as bad, if not worse, than it was then. When our civic officials will allow their own property to deteriorate in that way, it is very difficult to inspire the general public to better things.

The use of the press was touched upon. The editors of our daily papers are perfectly willing to grant us the opportunity of spreading our views in regard to these things; and, if we will interview them, will be only too glad to write an editorial on what we tell them.

In regard to leadership, you must have a constant leader in all this work. I do not mean a leader who is competent from a scientific standpoint so much as one who is competent from a standpoint of enthusiasm. If he is an enthusiast. the people will follow him though he may not be a scientist in the work.

In Guelph we would like to have the opportunity of developing our station premises, and when the Grand Trunk railway gives us a new station we will see what we can do toward helping them to beautify their surroundings. At present we won't tackle it. The thought expressed by Mr. Scott, as to the beautifying of our cities and towns, having an economic bearing upon business establishments, is exceedingly important; and I think that it cannot be impressed upon our people too strongly, that the more beautiful we make our home surroundings and our town surroundings, generally speaking, the more we will attract the people to that community, and, consequently, the greater will be the business advantages of the place.

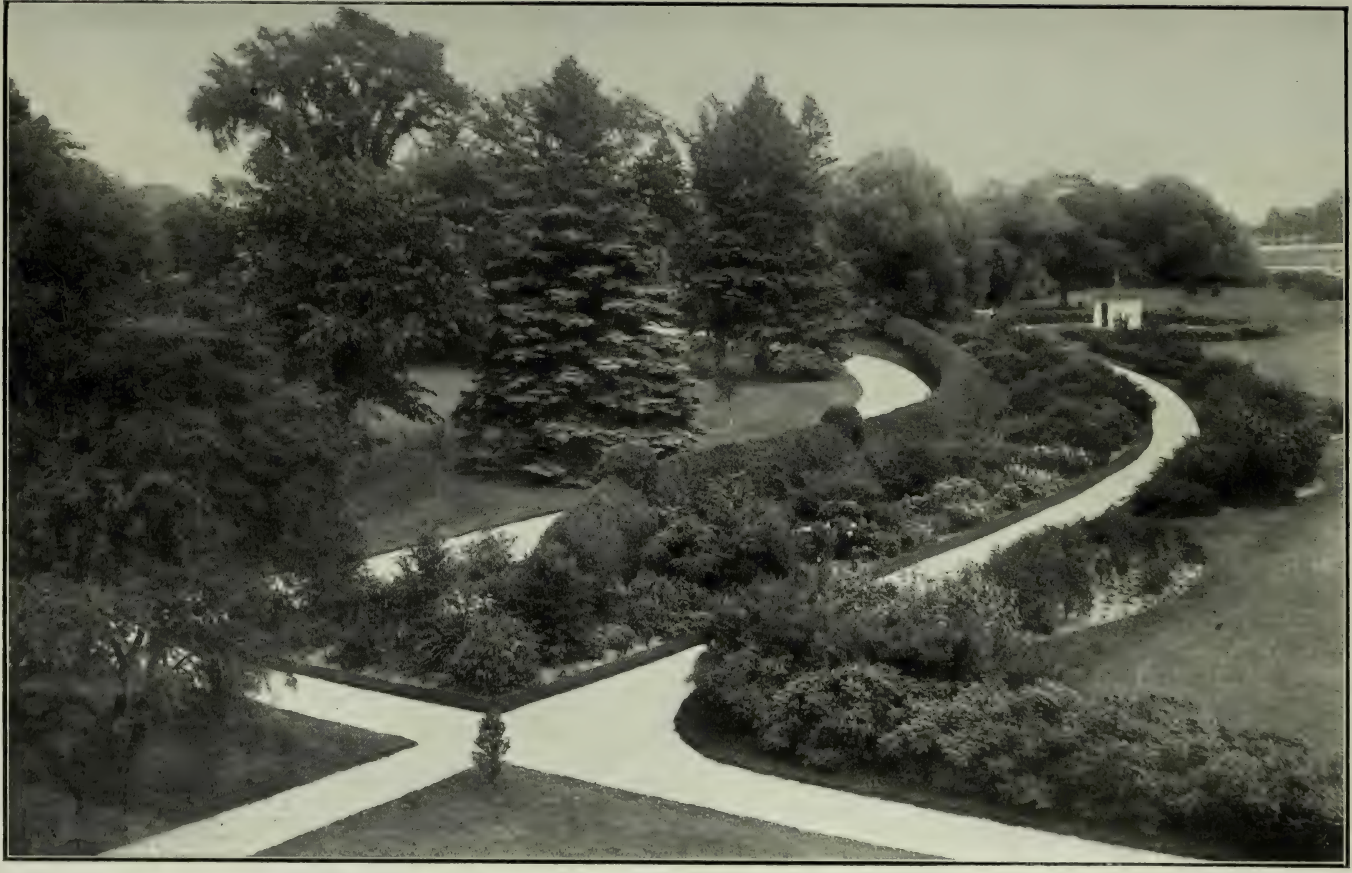
Now, from the standpoint of education. That, to my mind, is the crux of the whole matter. It must be an educational work. Patriotism to the home is the hope of civic improvement; and, consequently, we must begin with the children, so that we may have in the years to come that attention to civic improvement for which we all long. We must train the child in the home. We are not able to get into the home unless we use the press and other means of educating the people in the home. It is difficult to get there, but there is a way by which we can get into it. We have a foundation upon which we can place civic improvement, and use it to the fullest advantage in bearing upon the public at large, and that is the public school. We can interest the children; we can develop in them the principle of civic improvement through the child life by impressing the child with the truest ideal. With such principles as we are endeavoring to instil into the child life it will not be many years before we have the parents interested; and if it is not the duty of the Horticultural Society to undertake this work, it is, nevertheless, at present the only definite organization which can undertake it; and, moreover, it is the privilege, a grand and glorious privilege, of the horticultural Society to work with the children and inspire them in this practical and direct work. We can widen the feeling of patriotism among these boys and girls and cultivate a love for the beautiful. To me the growing of all vegetables is as much pleasure as the growing of a geranium plant. This work of beginning among the children may seem a very slow matter, but we will not be in a hurry. The man who is in a hurry in any reformation, or in the development of any work in the community, will not accomplish the work that he seeks to do; but we must be diligent, and we will await the time when education, like the leaven, shall have done its work, and the whole community be thereby permeated. Co-operation with the civic authorities is necessary, and we can obtain that by a little tact in approaching them. In our city of Guelph we have a park and shade committee as a development of the city council, and we have the chairman of that committee thoroughly interested in our horticultural work, and he has undertaken the beginning of what we have been endeavoring to impress upon the people for years, and that is the proper trimming of the shade trees. The trees are plentiful, but thick: and in beautifying the city in that respect he has been criticised, and any one who does that work will be criticized. They think he is spoiling the trees, but in a few years the wounds from cutting the limbs will be healed, and the city will see the benefit.

If you want financial assistance from the Council do not ask too much at first; and in all things be able to tell the council what you are doing with the money you ask for.

We have been undertaking lawn competition in Guelph, and I may say that that work, although it has been small, is increasing, and many of the people of the city are being interested. We had window-box competitions, and in one or two years I understand that the increase in window box culture was something like 400 per cent., although the prizes given were exceedingly small during the year. It is exceedingly unfortunate that in our cities we find lots that are very poorly looked after; the boulevards are untrimmed, the lawns uncut; and right alongside of that lawn that is not well kept is a property that is beautiful to behold. I have seen this in our own city; and it seemed to me it would be a very good thing for our city council to pass a by-law governing the keeping of the boulevards and lawns in perfect condition, just like the by-law compelling people to clean the snow off, and any one who kept a lawn in an untidy condition would be charged up for the cutting of that lawn through civic co-operation. I appreciate very much Major Snelgrove's address on this subject.

Mr. Tibbs: There is one point that has not been touched upon, that is with regard to moving overhead wires and posts and the removal of unsightly fences. In some towns, almost every house has a fence around it, that, in the days gone by, may have looked very nice, but is now very dilapidated. We co-operated in our town in removing fences altogether, and the neighboring towns are adopting that, and it has a very marked effect in beautifying the city as a whole. I think something of that sort towards the beautifying of cities and towns could be done as well.

Mr. Diamond: It is pretty difficult to control corporations with the wires. I think that we are the only city in Ontario that has not a wire on the front street, or a pole, either telephone or electric light or telegraph. We



"Sidbrook Park," residence of W. L. Abbott, Cobourg, Ont.

Note the splendid effect of the perennial border on each side of the walk, with glimpses of a limpid brook running behind the bridge in the centre. A summer house in the midst of a rose garden is shown in the distance.

had a good battle to keep them off, but we succeeded. They get their service in, but they do not go on the front streets. While we, as a Horticultural Society, probably have branched out a little further than it was our intention when we organized, as to entering into civic improvement and interfering with municipal corporations, we have accomplished results which we might not probably have reached unless we had left it to the local Civic Improvement Association to deal with it in their respective places.

Mr. MOORE: I should like to say a word in regard to trimming trees in public streets. That is a matter that came before our London Horticultural Society; and, of course, in our city many streets have beautiful trees, but they are letting them grow out of proportion, and the Horticultural Society has been trying to take the matter up with the City Council. The council said there is no law to compel the uniform trimming of trees on the streets. I believe at our last Horticultural meeting they passed a resolution trying to bring the matter before the Ontario Government of passing a general law for the pruning of trees on the public streets and the highways throughout the country.

MR. DIAMOND: According to the Act as it exists to-day, trees in public highways belong to the corporation, and they are the only ones who have any authority over the trees on your boulevards. So far as we, as individuals are concerned, the trees in front of my place do not belong to me; they belong to the corporation, and they are the only ones who can deal with them.

Mr. MOORE: I might say we are a little better off than that. We plant the trees, but they are in such a position that I own one-half and the corporation the other half, and the corporation cannot take the tree down without my permission. I put them there, and take care of them. That is the position in which we stand to-day in London. Mr. Pearce has done a good work in London removing numerous trees from streets that have been an eye sore to the place; but at the same time there are a great many people who, when Mr. Pearce went to prune a tree would say: "You have no business here; get out of this;" and they would use a good deal of harsh abuse to him; but, when you go to the corporation they say: "I do not know that we have any right." I am very glad to learn from my friends that there is a law existing at the present time, and I will go back and tell London that they can be more free to cut the trees. The next thing is to get the money. We have a very poor corporation—we are not so wealthy as St. Catharines—but I think it is a matter that should be looked into.

Mr. REID: I would like to endorse the paper by Major Snelgrove, and the excellent points that were brought forth, with regard to the removing of fences. I think our streets would be very much improved by doing away with them entirely. In the vicinity in which I am residing I was the first one to start that. I started it in two places in Belleville. In the first place, the fence was getting old, and I said: "I am going to take down the fence," but they said: "You cannot get along without it." I said: "I am going to take mine down." The next-door neighbor said: "If you take yours down I will take mine down;" and we put in ornamental trees and shrubs. I moved to another part of the city where nearly every one kept cows, so they had to have fences up, and you could not leave the gate open without the cows getting in. Finally I decided I would take off the gate for one season, and I got along. People think they cannot get along without fences, but I think, if they will only try, they will find it will be a great improvement to the streets.

Mr. Gammage: In Mr. Harris' remarks he offered a suggestion regarding the press, and an idea struck me that if a press committee were appointed and articles on horticultural topics distributed free to each of the Horticultural Societies it could be done very cheaply. At the season of the year when you want to bring something prominent before the people an article on the subject could be distributed from all of the Horticultural Societies to their local papers. The congress of Horticultural Societies over on the other side do this to a great extent at a very minimum cost. They notify someone to write a suitable article and then it is set up and sent to the leading papers throughout the country. These articles are very largely appreciated, coming to the notice of the people at a season of the year when something along that line is interesting. Two years ago they contributed about $250 towards this, and that article was distributed to something like four hundred of the leading papers of the United States. Last year they did more than that, and distributed them to a proportionately larger number, and the secretary told me that they had applications from papers like the Chicago *Tribune*, the New York *Herald* and all the larger papers of the United States asking for those contributions, even saying they would pay for them if they could have them sent regularly from such a reliable source.

Mr. Dickson: In speaking about shade trees, I think we are making many mistakes. If you could plant better trees in the first place, and if as the trees grew up, the little limbs were cut off, it would keep the trees from branching out. Most of them planted in this country are soft maples. They grow to a very great size in a short time, but the wood is soft, and, in winter, the limbs get covered with snow and touch the ground or hang low on the street, and people break them off. I think we should plant better trees, not soft maples. About the only advantage these have is their rapid growth. I think the prairie maple is better.

Mr. Pearce: They are a good deal worse.

Mr. Moore: What trees would you recommend?

Mr. Diamond: Hard Maple.

Mr. Dickson: Mr. Scott spoke about the cemeteries. I was out in the country a while ago and I saw a small burying-ground with the tombstones all broken down, and a decrepit appearance all over the place. We even had something worse than that. A certain church had a cemetery which was abandoned. They removed most of the skeletons and sold the land to the city for a gravel-pit. In a short time the men began to dig up human skeletons, and people began to agitate about it. I was told that some of the men dug some human bones up and laid them in a pile; a Jew who came down the street, bought these bones and sold them to the fertilizing works.

Mr. Reid: With regard to the question of street trees, I do not know that we can get a better tree for the street than the elm. It is a tree that is very easily cared for. It will stand a great deal of bad weather and will not break off with the storms.

Mr. Diamond: My objection to the elm is that you cannot grow anything within a radius of 40 or 50 feet because of its roots. It is a very violent absorber of water.

Mr. Govenlock: Elm trees are good, but they grow away up. In Seaforth we had a very fine fence around a lot of maple trees. I took the fence away, and cut out every other tree, and then the others spread out. They were far too close together.

Mr. Pearce: In regard to pruning there is the Ontario Statute that authorizes a person to cut down, transplant or remove trees on the streets of any town or city, and thin them out to 30 feet apart. There is the whole thing in a nutshell. My contention is that the municipality should do the pruning, regardless of anybody else; but our Council told me they could not afford it. It is absurd that they cannot pay a man four or five hundred a year to prune trees. Some are spoiling for the want of it. They have not been pruned for years, and the old limbs should be cut off. Never cut a big limb off. You may in a soft maple, but do not in anything else. I have seen trees butchered in a most abominable manner; and London is not an exception. Where pruning is done you should get somebody to do it who understands the principles and laws of pruning.

Mr. Hutt: In the question of Civic Improvement it is hard to know where to start in. Trees are such an important thing in the beautifying of streets. Still, I want to emphasize one point made by Mr. Harris, who advises a good vegetable as well as a good flowering plant, and I would like to give a little instance of the work we did at Guelph. I think we can improve as much in the back as in the front yard, and good vegetables are going to help us much. If the people get out in the back they will soon come around to the front. Through the Experimental Union we distributed a number of vegetable seeds to school children, issuing a printed circular showing how to grow them, and reports were made at the end of the season. We then got after the directors of the local Fall Fair, and they offered prizes for the best vegetables grown by the children, and the biggest feature at the Fall Fair was the School Children's Exhibit. They had a hall to hold it in, and the boys were down at seven in the morning with their beets, etc., to put in the Fair. I think, if we could get into the back yards and start our civic improvement there, we could accomplish a great deal. I should be glad to distribute our circulars to the Secretaries of all the Horticultural Societies in the Province, and, if they wished, have the programme laid before the schools. I would like the children to take up the vegetable work, and that would tend towards civic improvement.

Mr. Jarvis: I do not intend to keep you very long, but I want to say a word or two to you about the trimming and training of trees. I live in a town fourteen miles east of here, and our streets are well bordered with grown up hard and soft maples. In trimming, the Roads and Trees' Committee once a year take their men and go from one end of the streets to the other with a team; they cut the small brush off, and the wood which is cut off is delivered to the poor of the city. They are supplied with wood for the winter from these trees, and, as it is removed while they go along, there is no objection made. I took great pleasure in Major Snelgrove's paper; and, if we are able to carry out even a percentage of the good work he intimated therein, we will do pretty well.

The President: I want to ask a question which I would like some of you to answer: How do you deal with the bill board nuisance in the streets? I think that is a more irritating grievance than all of the others combined.

Mr. Pearce: Has the Province any power to deal with the bill board question?

The President: I think the Ontario Legislature should deal with that. It is quite unnecessary to put up with the bill board nuisance. It is depreciating the value of property to a very great degree and making an eyesore of a place that might otherwise be improved upon and made decent. I think I am one of the greatest sufferers in this Province from the existence of a bill board. My neighbor across the street is a bill poster for the city, and he has deemed it necessary to put a bill board all around two sides of his property, and he has one bill board about as high as the ceiling.

Mr. Moore: It might be a fight with the newspaper men and the bill board man who is to do the advertising.

Mr. Diamond: I took a photograph of that bill board, and I do not see why it cannot be put under the heading of "A Public Nuisance," and then there might be some legislation upon it. If the Government would so amend that Act, and say we could spend money in the direction of prosecuting people who have bill boards up, there might be something in it, but of course the law is very definite on the question. Call a bill board exhibit indecent pictures, and they are criminally liable under the by-law which the municipalities have power to pass; but I know in one part of our city that matter came up as to the question of a bill board in a very prominent place. We made a declaration that no bill board should be permitted near that place, and none have been since; but where they are placed on private property I do not see how we can handle it. The private property owner can do it on his own premises, so long as there is no obscene advertising.

A Member: We had a case in our city where a man had a high board fence, and a wealthy comporation came long and they thought they would make him take it down, but it cost a couple of hundred dollars. They had very learned counsels on both sides, and it was a very expensive suit.

The President: It seems to to me the only way of righting it is through the license question, imposing a license for bill boards, and the larger the bill board the higher the license. The two-stand bill boards is not very bad, but when it comes to the long stretch it is a nuisance that ought to be suppressed. It would be very advisable if towns were given the power by legislature to impose a license on the bill board the same as on the pool room or junk shop, which are evils to be tolerated but put under restriction.

Mr. Pearce: Even coming down from Hamilton to Toronto on the train there are unsightly signs. The city of Berlin, Germany, has received $90,000 from the bill board license, and there is nothing allowed there higher than a board three feet wide and twelve feet high: that is the regulation size.

Moved by Major Snelgrove, and seconded by Mr. Pearce, "that a committee be appointed to draft a memorial to the Ontario Government asking for the introduction of legislation regulating the bill board nuisance by way of a license giving power to municipalities."

Mr. Moore: They should also add to that the tacking of signs as that is a great nuisance.

The President: We had better not undertake too much at one time.

The motion was then carried.

A committee was appointed to deal with the matter, composed of the Rev. Mr. Harris, Mr. Pearce, and Major Snelgrove.

The President: I have in my hand a couple of questions submitted by the Owen Sound Horticultural Society. I am sure we are glad to welcome the lady delegate from the society, Mrs. Robert McDowall. I will read the questions to you. One of them has to deal more particularly with the department controlled by our friend, Mr. Wilson; the other is a question which is open to the discussion of the members.

1. "Would it be advisable to issue a few copies of the different papers read at this meeting to the several local societies so that the members may add to the discussion of the several papers before the final printing of the report of this meeting?"

I presume it would be impossible to issue copies of the papers preliminary to the printing of the report; however, Mr. Wilson has assured me that the report will be rushed out with all possible despatch, and that it will be in the hands of the members at the earliest possible date.

The second question will be of interest to all:

2. "Can any member suggest a way of drawing members out to, say, monthly meetings of a local society?

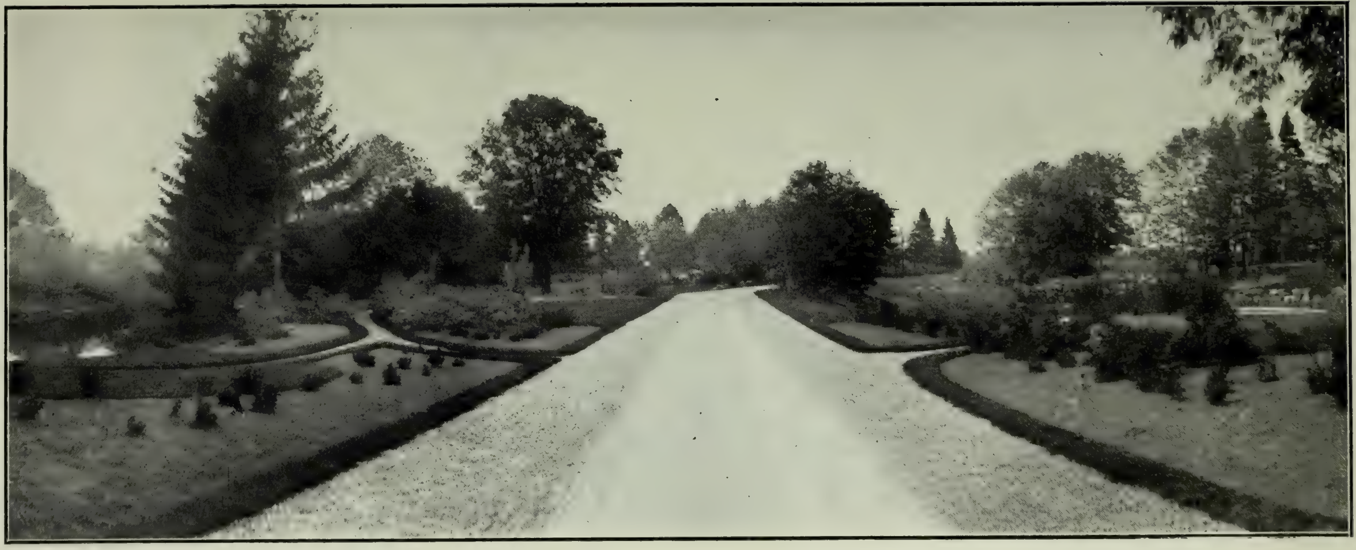
Mr. Diamond: I would like to have an idea from one of the ladies on that subject, because if they cannot get the members out, I am afraid we poor individuals would not be able to get them.

Mrs. McDowall: I have never made a speech, and I am not going to now; but it was suggested in our Society that we should have monthly meetings and have some one in the society bring up and discuss one subject—either vegetable or flower—and give their experience in every way. Our President was unable to be with us, so they have sent me down. If you will discuss the question I shall be very happy to give them any views that might be brought forward.

Mr. Woolverton: The Grimsby Society has adopted the plan mentioned by this lady. It is a small society, with from sixty to seventy-five members. During the summer season they have held monthly meetings; and one subject is taken up by some member of the society, introduced by a paper read by him or her, and discussed in a free and easy manner. In order to make the meetings more interesting they are enlivened by music and singing. A certain length of time is also given up after the programme is over to a little social conversation. In that way the whole evening is a most interesting one. There is another feature that has also been adopted which is good, and that is the showing of a table of flowers—where possible, house plants. This helps in the social nature of the evening, because the viewing of the plants makes people move around in a social way. I may say that this plan has proved very successful, and the number who come out to these meetings is quite surprising. It also helps the secretary in getting in his membership fees, because every one has felt that it has been a very enjoyable evening, and they all want to be in it. As a result, there is no difficulty in securing the fees.

Mr. Diamond: There are only two Associations that can give us their experience: St. Catharines, with a membership of 287, has the largest membership, and I think the President should give the information as to how they get their members.

The President: I may say that question might come up again. That is not really the question that comes from the Owen Sound Society. It is how to draw members out to their monthly meetings. I should be glad to give you any information as to how we get our membership. We have no monthly meetings, but we have them as frequently as we can. Every society has meetings of some kind, and perhaps they are not as thorough a success as regards attendance. Now those who have frequent meetings and a good attendance might tell us what they do to secure them, and I am glad



Entrance to palatial residence of Mrs. Chas. Donnelly, Cobourg, Ont.
Note the pretty fish pond to the left.

that Mrs. McDowall has broken the ice and addressed us briefly, and I hope that other ladies will emulate her idea.

Mr. Cowan : Some of our societies have adopted that, and they arranged for meetings in the gardens of some of the members. If one member is making a specialty of roses they try to meet there in the time of roses. If another one is interested in peonies, they meet there while these are in bloom; and in that way they have little talks and discussions, and they find them of great value and interest.

Mr. Dickson : The matter of getting attendance is an interesting question. In Hamilton we do not succeed in getting a good attendance. We always send postal cards to the members. We have 108 on our roll and sometimes we have very good meetings. We advertise in the papers also, and we try to have meetings every month in the winter. There are people in Hamilton who have nice places, and we meet on their lawns, and sometimes the meetings are well attended. I think smaller places always a larger attendance. You take a place of 10,000 and less, and they have not anything like the amusements we have in Hamilton or in Toronto. It would be well for some person to tell us how to fill the hall.

Mr. Jarvis : We have always found that in our town one of the greatest troubles is to get a full house. We have tried sending out cards and putting on the bottom "Oysters will be served," and we have a full house. Buy a gallon of oysters and serve them, and you will have no trouble at all,--and have strawberries in summer.

Mr. Short : I will give you the method that the Ottawa Society carries out in respect to meetings. We do not hold meetings in the winter, but the monthly meetings are held in summer—from May until October—and at those meetings there are prizes offered for different fruits, flowers, and vegetables in season. We have a speaker, and while he is giving his address the exhibits are judged. They are quite numerous, the judging taking up nearly an hour. After that is over and the speaker is through, fifteen or twenty minutes are given to the audience to inspect the exhibits and to look at the names of the different exhibitors and test the quality. Then, as has been the general practice, the exhibitors give away their exhibits to their friends, and our attendances are always good. I may say that our average attendance is one hundred at least. Mr. Whyte says it is more than that. We have a large hall, and it is usually very well filled.

The President : I would just say, in regard to our public meetings in St. Catharines, that I do not think in our recent history that we have ever had such an attendance as they have in Hamilton. When they come to St. Catharines we give them a fairly good audience. We make judicious use of printers' ink, and perhaps get some musical programme in addition to the lecture of the evening, and we generally get a fairly good house, although we do not make it altogether free; we ask a silver collection at the door. We are not afraid to ask the people to give us something to hear an address on horticultural subjects.

Mr. Gammage : I might say that in London they have tried to induce the public to come out and attend the meetings, but they always look at it with a graceful indifference. But there is one time when we do get the members and the public out, and that is when we have our three exhibitions in the city hall. We get the city hall free for the use of the exhibitions, and it is free to the public. We give no prizes but we have a large attendance. At our last exhibition in August, there were not less than 2,000 individual exhibits, and they pretty well filled the main body of our hall. It was open for two days, afternoons and evenings, and the members came together examining the exhibits, and as usual they discuss the merits and the demerits. There is a friendly rivalry between the people there, although there is no other particular inducement, and these exhibitions have been running for five years.

On assembling on Friday morning, the minutes of the previous afternoon's meeting were taken as read.

The President: Our election of officers should come up at 10 o'clock, but preliminary to that, the executive committee, or rather the Board of Directors took some action yesterday afternoon, that should be presented to this convention before we elect officers. You remember at the last meeting of our Association, Mr. Whyte moved that the Board of Directors should divide the Province into seven districts, and that one director should be elected for each of these districts. The Board of Directors recommend as follows:—

District No. 1: The counties of Renfrew, Lanark, Carleton, Prescott, Glengarry, Stormont, Dundas and Leeds. It is a very large territory, the largest district I think in the Province. It contains 6 societies at present, but a new society is being organized in Morrisburg.

District No. 2: Would contain all that territory from the County of Frontenac west, as far as the County of Durham, and north. This district would contain 11 societies.

District No. 3: The counties north of Toronto, including Peel, York, Simcoe, Ontario and Muskoka, with 9 societies.

District No. 4: The counties of Lincoln, Welland, Haldimand, Halton, Wentworth and Norfolk, with 9 societies.

District No. 5: The Counties of Grey, Huron, and Bruce, with 9 societies.

District No. 6: The counties of Wellington, Waterloo, and Brant, with 9 societies.

District No. 7: The counties of Kent, Essex, Lambton, Elgin, Oxford, Middlesex and Perth, with 9 societies.

The Board of Directors recommend that these divisions of the Province be concurred in by these societies.

The adoption of the report was moved by Mr. Diamond, seconded by Rev. Mr. Scott, and carried.

The President: There was another motion adopted by the Board of Directors, of which I have not a copy, but I can give you the substance. It is that the office of secretary be divided, and that we have a recording secretary, and also a corresponding secretary and editor. It is contemplated, I may say, by the Board of Directors, to bring the Department into closer touch with the Horticultural Societies of the Province, and the Superintendent of Horticultural Societies should be the corresponding secretary and editor. We are imposing some new work upon the Superintendent of societies, but I feel he will be quite willing to accept this new responsibility and, in order to place this properly when we come to the election of officers, you will understand that there is a new one to elect. The Board of Directors advise the division of the secretary's office, so that there should be a corresponding editor and secretary.

Mr. Diamond: I move that the recommendation of the Board of Directors be adopted by this Association as to the election of a corresponding secretary and editor, to take place at the time we elect our officers. The motion was seconded by Mr. Lanstrath, and carried.

ELECTION OF OFFICERS.

The election of officers then took place, and resulted as given on page 8.

Mr. Diamond: I would ask the Association to pass a resolution that our retiring President shall become an honorary director. Carried unanimously.

Mr. Burgoyne: I thank you very much for the honor you have bestowed upon me. Now the business of the election of officers is closed, and before retiring from my office as President, I want to express my thanks to the Association for the kindness I have received from them during my term of office. It is a very distinguished honor to be the first President of a society like this, and I have much pleasure, therefore, in expressing my thanks to the Association for their support and kindness during the past two years. Now, it is my duty to retire from office, and to instal my worthy successor, Major Snelgrove.

Major Snelgrove: I am very thankful to you for the great compliment you have conferred upon me in electing me to the highest office in your gift. I consider it to be a very distinguished honor to be President. We commenced the organization of this Association a few years ago, and after much toil and work, we have succeeded in launching it upon the tide of prosperity and progress, which I am sure is assured for us as one of the great corporations identified with the Department of Agriculture in this Province.

I am very proud to have had the opportunity of taking a humble part in organizing this Ontario Horticultural Association, and I think it is proper to say that my colleagues on the organization committee, deserve a great deal of credit for carrying out this scheme, but we should not forget that we owe a great deal of the inspiration to the Department of Agriculture. We had, from the first, the entire support of the ex-Minister of Agriculture, the Hon. John Dryden, and his worthy successor, Hon. Nelson Monteith, who is here to-day. They have in every way encouraged and supported us in developing the æsthetic side of our work in the cities of this fine Province. We have also had a great deal of advice from Mr. C. C. James, but I would like to pay tribute to our secretary—Mr. Cowan, who has been indefatigable from the first, in helping to organize this Association. It fills a long felt want, which places us in affiliation with all the Horticultural Societies in the Province. There was, before this organization, no bond of affinity or association between the different societies. I would ask the new directors who represent the districts into which the Province has been divided, to look after particularly, the different societies that are in them and to see, if possible, that every society is represented at our next meeting. We certainly have become a great centre of interest in this Province, and I trust that the work will go on and prosper as it has during the last year under the Presidency of Mr. Burgoyne, to whom we owe so much, and to whose tact, talent, and faithfulness to duty, we are under a great debt of obligation.

Mr. Burgoyne: Before proceeding with the order of the day, I think we should give our distinguished visitor, the Hon. Mr. Monteith, an opportunity of saying a few words to us. His time is very valuable, and we appreciate his presence here this morning. It is not right to detain him when he has so many important duties, so I will now invite, Mr. Monteith to address us.

ADDRESS.

By Hon. Nelson Monteith, Toronto.

I did not come here this morning with the intention of inflicting a speech on you. I just dropped in as an interested and sympathetic visitor in search of information, and for the purpose of becoming better acquainted with the delegates here assembled. I am glad to see such a large and representative gathering of those interested in horticultural work in this Province and I wish to congratulate you on the excellence of the floral display now being made at Massey Hall in conjunction with the exhibits of fruits and other products. It reflects the greatest credit on those who have contributed to it and indicates what an important position the growing of flowers for adornment, and fruit for commercial purposes is assuming. Such an exhibition should attract to it not only those who make a business or a hobby of growing plants, fruit and flowers, but all those who take a delight in viewing such products in their greatest perfection.

Two years ago Horticultural Societies were placed on a basis independent of Agricultural Societies, and I believe that the change has resulted in stimulating the interest of their members, and in adding to the usefulness of these organizations. Horticultural Associations can be made to benefit the community in numerous ways. The influence of the individual example in improving the surroundings of the home is one that very quickly makes itself felt. The man who introduces beautiful plants and flowers to surround his home, creates a desire on the part of his neighbors for similar improvement. The influence extends from his home to the homes of his neighbors, to the street where he lives, and finally influences the town or village to a greater or less extent. This is a form of civic and rural improvement in which all can take part. Organized movements such as yours, looking toward such improvement should receive encouragement from all good citizens, and beneficial results are sure to follow. Much may be done in this way to improve horticulturists' homes, beautify parks, boulevards and highways, and the uplifting tendency to communities will indeed be great.

The time seems to me to be ripe for a great step forward. As you are aware, we, who represent the Department of Agriculture, feel that we should co-operate with you and help forward as much as possible the work in which you are engaged. Co-operation is the watchword of to-day, and it has been the means of overcoming many of the difficulties by which the farmer, fruit-grower, horticulturist and vegetable-grower have been beset in the past. Witness co-operation in spraying; and you, gentlemen, can make your respective societies more successful even than they are now, if you will all co-operate in working in their interests in the several lines in which each one of them is seeking to promote the improvement of horticulture and the development of the beautiful in nature.

I must congratulate you, sir, on being called to fill such an important position as President of this Association. I know that you appreciate the responsibility that has been placed upon you, and my hope is that those who are associated with you in the work of this Association also feel the responsibility which rests upon all concerned.

I must thank you for the opportunity you have given me of meeting those who are gathered here on this occasion. I can assure you that the work you are carrying on is fully appreciated by the Department over which I have the honor to preside, and such support and assistance as we can render the horticultural interests will be most cheerfully given.

Mr. Burgoyne: I take this opportunity of moving that we express our appreciation of the honor done us by the visit of Hon. Mr. Monteith. I suggested that he should address us at this time, so that we should not take up too much of his valuable time, and he might be at liberty to retire, but I express the hope that he may remain with us, and hear the discussion on the papers read this morning. One of them will pertain very largely to the Department that he is so ably supervising, that is, "What amendment might be suggested to the Horticultural Act?" While it is, comparatively, a new measure, yet with the experience we have had in the past three years, we may possibly be able to discuss it. No doubt, suggestions will come up, and we appreciate that the Minister who has charge of that Legislation, should be present and hear the discussion, so as to be better prepared to act, when it comes before him. I have much pleasure in moving the thanks of the Association to the Hon. Mr. Monteith for his visit this morning.

Mr. Diamond: I second that resolution. We eventually will become more acquainted with the Minister through these associations in our work, than in any other way. We may assail him hereafter in the matter of the amendments to the Act. Probably he may have some suggestion to make when it comes under discussion this afternoon, as there have been several memorials. We have pleasure in having the Minister with us this morning, and we will endeavor to convey to him what we want, and I know he will give us whatever we require, if it be in the line of duty.

The motion was heartily carried.

THE BEST METHOD OF INCREASING THE MEMBERSHIP OF A HORTICULTURAL SOCIETY.

Mr. Burgoyne: As neither Mr. John O. Cheyne, or Dr. J. S. McCallum, are present, and as this is one of the most important questions that come before us, I suggest that Col. Whyte, of Ottawa, who comes from a society that has a record as being one of the best societies in the Province, should tell us how they attained their very large membership so that we may learn something from their experience.

Mr. Whyte: I did not expect to be called on to take Mr. Cheyne's place in this matter, but I intended to have something to say on it. I do not suppose there is any subject that can come before the members of the Horticultural Societies with greater force than that of increasing their membership. Our membership is a very important factor, as the amount of grant got depends on it; the larger the grant, the more we can do, so it is an important matter how we can increase the membership of our individual societies. After an experience of about fifteen years in this matter, we have very definite ideas in the Ottawa Society, of the best way to go about that, and there are a good many features in our work that we think are important. I do not know that there is any better way than a personal canvass on the part of the directors. When you consider the subscription is only a dollar, there is hardly any community in the country that has not two or three hundred people who are willing to pay a dollar if you can show them that you are doing something. I think that is the chief feature in increasing the membership. As soon as we settle on the programme for the year, we get out a prize list, and a premium list; then the directors are expected to see their friends, everyone who, they think, is likely to join,

Where the Fountain Plays.

School Garden.

and it is very seldom we get a refusal. We could double the membership if we had more time to look after it, but we are mostly busy men. Of course, as most people like to get something for their money, it is important to have a good premium list. In Ottawa we have as good a list as we can possibly afford. I have not got a copy of it here, but we like to vary it every year and make it as attractive as we can, and as inclusive as possible. To people who have no garden, we give something which they can plant in the house. I think St. Catharines has probably the best premium list that I have seen yet. As I told our friend, Mr. Burgoyne, we intend to copy some items from it. They have a very large option of twenty-seven different items. Possibly this is a little too many. They gave an option of peonies, another one of cannas and gladioli, so that any one who is interested in growing any of these flowers, can take one of these options and get enough of one thing to make an effective show. Another thing they do which is good—they give an order on a local concern for $1.00 worth; then any body who does not like the items on the premium list can go and select what they like. We will make that one of our options next year.

Another very important question is that of enlisting the support of the newspaper. Publicity is one great thing required. We want people to know what we are doing, and the only way you can get publicity in the best sense, is to keep the newspaper on your side. We owe a great deal to the local newspapers; they publish full reports, and put in any information we like to send them. I think it is a good plan to have a committee in the society to make out the report and send it into them, and then you are sure of having a good one. We have no difficulty in having a column or half a column in all our three papers at each of our exhibitions, and that is of immense value to us, and it is a thing any society can get if they are a live one.

Another very important thing, which is easier managed in a small society than a large one, is the school work. It is of very great importance to a society to interest the school children, because if you get a child interested in your work, you interest the parents, and the parents will become members. In a large city it is rather hard. I have tried it in Ottawa, and we had to select so many children from each school, but in a place where the children are not too numerous, I don't know of anything that will lead to the growth of a society so much, because you are interesting so many people. If a child gets a prize for flower growing, you are sure the parents will be there, and then it is your fault if you do not hold them.

Another thing, I would suggest, is the keeping up of monthly exhibitions. We devote as large a part of the funds as we can, to giving prizes at these exhibitions. We do not charge any admission fee. We give the prizes, and the doors are thrown open to anyone, member or otherwise. We can go to the public who are not horticulturally inclined, and say, "Here is the work we are doing, give us a dollar to help pay expenses," and hardly anyone refuses because they see we are doing a good work. We try to make the exhibits as attractive as we can and we have a change of exhibits every month, with different materials every time. We would like to carry it on longer than one day, because we feel that it is an immense amount of work just for one evening, but we find it difficult to carry it over to the next day. A great many of the members are working men who get off at five and hurry to the exhibition, and at night a good many want to take their exhibits home.

It might be of interest to give you a short sketch of how we conduct these exhibitions. A prize-list every year is issued to the members beforehand,

and they know what they have to grow, and they bring their exhibits to the hall, and everything has to be on the table at 8 o'clock for the judges. The President takes the chair about 8 o'clock and calls the meeting to order, then the judges begin their work, which takes about an hour. We have a judge for fruit, and one for flowers, and they have acted in this capacity for several years. The great advantage in having judges in this way is that the judgment is more uniform. We have two professional men, and their services have been very much appreciated and are perfectly satisfactory.

Speakers are all arranged for the season. Generally one of our own members, while the judges are going around, gives an address which is open for discussion. Then we have a department for the question box, on which I put a very high value. During the evening, anybody can write out a question pertaining to horticulture, and these questions are gathered up by the secretary and given to the chairman, who reads out the questions, and he will call upon Mr. Macoun, or, if he chooses, he answers it himself, or calls on anyone in the audience. Sometimes a question is asked which cannot be answered on the spur of the moment, and that is kept over until the next night. These are the principal points I can think of. This year it has been practically adopted by the board of directors that we are to have summer meetings in the gardens of individual members.

Suppose we decide to have a meeting during the rose season; we go to the most successful rose grower, and have a meeting in his garden, and we invite the general public to come. Someone who is an authority on rose culture gives an address, and demonstrates before them all what he is saying. That is going to be a very important feature in our programme.

Mr. Burgoyne: We have with us this morning, the Secretary of the Kincardine Horticultural Society, Mr. Joseph Barker. He has occupied the position of Secretary longer than any other person in the Province, and we would be delighted to have him address us.

Mr. Barker: I would say that we have tried two methods for the purpose of increasing our membership. The first we adopted, was to appeal to the papers. We thought we had nothing else to do but just notify the papers that a Horticultural Society had been organized in the town of Kincardine, and they would do the rest for us. We learned very quickly that there was no response, not because they had any dislike to the society or its object, but simply because there was not, I suppose, $5 accompanying the request. We learned that newspapers were established for business purposes more than anything else, that their space is of importance, especially if you want to get some article published that you are writing, free for the public. I do not find fault, but I think they taught me a very valuable lesson, and we have endeavored to profit by it, so we were thrown upon our own resources in another direction, and I suggested that a personal application be made to anyone having a garden, and we would give them such varieties of flowers as we thought suitable. Difficulties were met with such, I suppose as are common to almost every enterprise or project. Some had heard of it, and some had not. I found that when I got hold of a Presbyterian, I had a good weapon in my hand that I could make use of in securing a subscription. Rev. Dr. Murray is the pastor of the Presbyterian Church there, and a member of our society. On one occasion, meeting me on the street, he said, "Barker, how is your society getting along?" I said, "Our society, if you like, but not mine; we look to you and to all the directors, and the members of the society for co-operation." He is a very emphatic man, and he said, "I will tell you one thing, that you have the best society in Kincardine." After hearing that, whenever I came in contact with a Presbyterian, I always asked for a subscription for the Kincardine Horticultural Society. One man I asked began to button up his pocket, and tell me about hard times. I said, "Not another word on that score, your own pastor, Dr. Murray, has given me the assurance that ours is the best society in Kincardine, and on that ground if no other, I ask you for your subscription." I do not leave the house until I get the name and fee of $1.00. I tell them all about the premiums given and some want to know what the prizes are. We do not give prizes, but premiums to all, and we have a committee appointed to select them, and they know the various tastes of the members of the society. They make some fifteen or sixteen collections and they say, "Here you are, ladies and gentlemen, make your own choice." I tell them when they complain that their choice is not a good one; that it is not the fault of the committee, and not to be discouraged if they do not succeed in the first place, but to try again, and get a good choice the next time. I deal as a rule, with the lady of the house, and I say, "Are you fond of flowers?" and I never go on these errands without taking the *Horticulturist* with me. "I see you haven't any flowers in the garden, and you haven't any in the windows, do not you love flowers?" and they invariably say, "Oh, yes.". I have not met with a single lady who said that she did not love flowers. It is in that way that the soctiey in Kincardine has built up a membership of 118, and I am not satisfied with that. I say the Kincardine Horticultural Society should have at least 150 members; that is the ideal I have in my mind, and I am not going to be content, although I am not very young, until we get 150.

If great success is to come to a Horticultural Society, it must come largely through the efforts of the Secretary. The soliciting work is left to me. There was a time when I did not care very much about it. I sometimes reply when they say, "You are getting old, why don't you let some of the others take it?" Well, I am only eighty-two years young, and if I do not do it, who will?"

These are the only two efforts we have made in the Town of Kincardine in order to maintain our Horticultural Association. I recognize, and I presume every member of the Association recognizes the importance of it, but I complain that sometimes they leave it all on the shoulders of the poor Secretary.

I could say a great deal to indicate to you the ground that we have taken heretofore, but that is sufficient. I say to the directors, and to other members I come in contact with, "Cultivate love for the flowers, and as much as you please of the liking for fruit." I like fruit as well as anyone, and had I been in Adam's place in Eden, I believe I would have fallen a prey to the seductive reasoning of Eve, and joined her in eating the apple, for I *like* fruit, but I *love* flowers.

Mr. GOVANLOCK: I agree with the importance of canvassing, and the first thing we do at the annual meeting is to see that we get workers. One man has an influence in his district that another has not, and he can get a number in that way; and, also we get out a very good prize list. We have an expert man who gives directions how to plant flowers. Now, I do not care how fine a plant you get, and how well planted it may be, if you do not follow out the directions, it will not turn out right. There are two points that have not been touched on at all, and that is the cultivation of fruit or flowers. You should get out a good prize list and have the directors go over your districts thoroughly. We commenced a few years ago, with forty or fifty members, and last year we had one hundred and sixty-three in a small place like Seaforth. We issue a list in the spring from which they can choose, giving 40 or 50 cents' worth of bulbs, with directions how to plant them. We generally get a good many more bulbs than we need. We got seventeen new members, who paid in their money for the coming year, by giving these bulbs.

Mr. GAMMAGE: Personal solicitation has not much to do with it. Look at the attendance at the flower shows. They had 1,624 paid admissions; so it shows what appreciation people have for these things, without personal solicitation.

Mr. MOORE: Might I ask Mr. Whyte how many shows they hold in Ottawa during the season?

Mr. WHYTE: One show each month—May, June, July, August, September and October.

Mr. BURGOYNE: I feel interested, not only in our own St. Catharines' Society, but in all the others in the Province. We have all some one thing to learn from another, and we owe a great deal of our success to the Ottawa Society because we have tried to copy in some measure from them. They started before us, and we copied from them, and we have enlarged upon their work. We started, for instance, with two or three options. Mr. Whyte says we had twenty-seven last year. They had fourteen or eighteen. We only went one better, but it was on the right lines. I think it is a wise course. We won't reduce the options this year. I do not know what the Ottawa people decided as to the value of the premiums they gave. We put our whole cost on what we would give in the way of premiums at about 75 cents. I think the Ottawa people went further.

Mr. WHYTE: No, 70 cents.

Mr. BURGOYNE: Some of the societies probably gave considerably more than that, but that is about the value that we put upon any of the options. Mr. Whyte spoke about us giving a large number. We started in getting them to take all roses, but we soon got into the large list, and I had our secretary send to every society in the Province one of our option lists. That is something that every society might do—send to the other societies their premiums for the year, so that they might have the advantage of learning what others were doing. Mr. Whyte referred to the monthly exhibitions. We held three exhibitions in the summer, while in Ottawa they hold six. Our exhibitions are larger than theirs. We do not admit the people free, except our own members, to whom we give a coupon of admission; but to the outsider we charge 15 or 25 cents. We receive from our June and July exhibitions, in admission fees, not less than $50 or $60 for each one. Mr. Whyte gave me the key-note of their success in September when he was speaking of the money prize exhibitions. We never tried any other system in St. Catharines, but I agree that the success of exhibition work is due to the principle of paying money prizes. Before the adoption of this new Act it was illegal to give money prizes, but we decided to ignore the Act and give them. We got the list out early of a large number of options, and then by systematic work and spreading it over the city and the immediate suburbs, we got the membership that we have. I do not know that Ottawa or St. Catharines can boast very much of what they have done because there are a number of societies that have a larger number of members in proportion to population. Take the Kincardine membership of 118. For a town of that size it is really more to their credit than three or four hundred members in cities like Ottawa and St. Catharines; and that applies to all the other Horticultural Societies in the Province. When they get a membership of seventy-five or one hundred and fifty they are doing splendid work.

The PRESIDENT: I regret that we have to close a topic that is very fruitful of practical information, but in justice to the other gentlemen who are on the programme I must declare this discussion closed.

THE SELECTION AND CLASSIFICATION OF FLOWERS.

By John Cavers, Oakville.

In April last I had the pleasure of addressing a letter to the executive committee of this Association in which I endeavored to show the need for a revision of the nomenclature and description of some species of flowers, especially of perennial Phlox, Japan Iris and Gladiolus. The secretary, in his capacity of editor of *The Canadian Horticulturist*, did me the honor of publishing this letter as the leading article of the issue, and in this way, partial and imperfect as it is, the topic now to be discussed has been before you for some months. I then endeavored to show that the interests of Canadian and United States Horticulturists were closely akin; that the result of any work done in either country for the promotion of knowledge of the science and the art of horticulture becomes the common property of both countries; that membership in the societies relating to horticulture in both countries is not confined to the country which happens to be the home of the society; that the American Rose Society has a parental oversight over the varieties of that flower, and takes care to have the Rose children originated abroad properly introduced, and the young roses originated in America properly named and described before their children are sent out into the world; that the American Carnation Society does similar offices for the "Divine Fower"; and that the American Peony Society, although young in years, has undertaken, in conjunction with the Department of Horticulture at Cornell University, a heavy task in clearing up many serious discrepancies in the long list of varieties of the "Flower of Prosperity," a piece of work that will require at least three years to produce results that can be presented to the public. The society of the American Florists in a more general way takes cognizance of new varieties of flowers. In regard to the three varieties I have named for consideration, there is no society charged with the oversight of any one of them. Not that they are unimportant flowers. It is now generally recognized that the phlox is one of the best six herbaceous perennials. The gladiolus is not only beautiful, but is most easily cultivated and cared for; while its returns in annual bloom and increase of corms is perhaps unequalled in the floral kingdom. Those of us who have had the privilege of seeing some of Groff's new varieties not yet in commerce, a few of which were exhibited at the Convention of the Canadian Horticultural Association in London last August, and others which are described in one of the last numbers of *The Canadian Horticulturist*, realize that the flower-loving public which knows only the varieties of this flower now in commerce have delightful surprises in store in these new varieties. The Japanese Iris, as we know it, is a grand acquisition to the garden, but, from an article in the last number of "Suburban Life," we are led to expect that in the not distant future surprises, at least equal to what I have hinted at in the case of the Gladiolus, will be revealed to us. In the meantime Japanese Horticulturists are not so much imbued with the spirit of Western commercialism as to part with their best Irises for any amount of money. I do not advocate the formation of a society for any of these three flowers. Some day we may see an Iris society in America, but it is not in sight.

Since April, evidence has accumulated that there is much need for action on the line under consideration. We have had spirited and in some cases unseemly correspondence in the trade press on what should be considered the standard in the naming and description of species and varieties of plants, and and also in regard to the claims of individuals to be the originators of profitable varieties. The naming of plants, both the species and varieties, is a matter of world-wide interest; and never so much so as in these days. The opening up of China and Japan in recent years to the commerce of the world with their wealth of horticultural products, the work of many centuries, adds much to the significance of this statement. The naming of a new plant is not of country or of individual. To be sure the discoverer of a new plant or the originator of a new species or variety should have a say in the naming of his discovery or product, but such name should be submitted for final recognition to some competent authority before the plant is put into commerce. A plant name once adopted should never be changed. In cases in which there two or more names for the same plant in commerce, the oldest name, *i.e.*, the original name, should prevail. Index Kewensis is the oldest generally recognized standard of plant names amongst the Anglo-Saxon peoples. It is also the standard generally adopted in European countries. It is a register of species of plants only, published in Latin. The registration of varieties in the various species is provided for by the issue of "Guides," revised at intervals, seven in all, which may be had for 9s. 9d. sterling. The guides on Herbaceous plants costs 2s. 6d. sterling. The "Index" is expensive and there are few copies in the United States and still fewer in Canada. Nicholson's dictionary of gardening is the standard recognized by the society of American Florists. This standard was adopted a number of years ago, before Bailey's Encyclopedia of American Horticulture was published. It is now advocated by Wilhelm Miller, the editor of the *Garden Magazine,* and others that Bailey's work should be adopted as the standard for America. It is claimed for this encyclopedia that it is practically a complete record of species and varieties of plants known in America up to the year 1900. It is published in four volumes and costs $20. So far there have been no supplements issued. While Nicholson's Dictionary of Gardening is still the recognized standard for the society of American Florists the rivalry, confined to America, may be said to be between Index Kewensis and Bailey's Encyclopedia, the former world-wide in its scope, more accurate and complete, but published in Latin (the world language) and the latter work more easily accessible and practical for English-speaking peoples. Some prominent Horticulturists in the United States, amongst whom I may mention the late Thomas Meehan of Germantown, Pa., and his son Joseph, are quite pronounced in their preference for the "Index." One American writer states plainly that neither Nicholson nor Bailey can be depended upon for standard names. The Canadian Horticultural Societies so far have not taken action in the direction of adopting a standard of plant names. I submit that the matter should be thoroughly considered. For myself I want to make a plea for such consideration on the lines of a world-wide recognition of names and descriptions of plants.

I desire now to direct attention to some cases of confusion in the names and descriptions of varieties of the flowers named at the beginning of this paper. In catalogues on my shelves I find the following descriptions of "Le Soleil" Phlox, viz.: "Deep Carmine," "Rosy Magenta with crimson eye and light halo," "Lovely soft rose pink, White centre;" "Soft Rose, shaded pink;" "Brilliant China-pink, centre bright rose surrounded by pale rose tint."

I think it is clear that the recital of these descriptions shows not only a confusion as to the colors of the varieties attempted to be described but a confusion of varieties as well. One man may pronounce a flower to be "deep carmine" while another, I do not say accurately, may say that the same flower is "rosy magenta" or "China pink;" but neither is likely to make the mistake of pronouncing that the same variety produces flowers with both "white centres" and "crimson eyes." More than one variety of phlox is evidently sold as "Le Soleil."

Iris Kaempferii, or Japan Iris, is in a bad state of confusion in this country and in the United States as regards names of varieties. This condition has apparently arisen from the fact that several enterprising nurserymen have made importations of this flower from Japan, and as the Japanese names were unintelligible to English-speaking people, they resorted without co-operation, to more than one means for distinguishing the varieties when they were propagated and sold. What is apparently the best list of this flower that I have is from a prominent firm in Pennsylvania. It comprises 64 varieties, and the foundation stock of the collection was said to be identical with the collection in the Royal Gardens in Japan. The proprietors do not vouch for this statement, and in view of the article on Japan Iris in "Suburban Life" already alluded to the statement may be discounted. The proprietors say "as the Japanese names are unintelligible and impossible to remember we have renamed the collection." This renaming was evidently done without co-operation with other growers of Iris, and without obtaining the recognition of anybody having authority to speak for the public. In some catalogues that I have the varieties are indicated by numbers only: In others by Japanese names and numbers; and in one other by Japanese names and their English equivalents. I have half a dozen catalogues that do not pretend to give names of varieties, but, of course the collections offered in these are very fine. There, apparently, has been no co-operation on the part of importers of this flower and no attempt has been made, with so far as I know only one exception, to place it before the pubilc in such a form as would be acceptable to flower lovers, who want to be able to recognize their flower-friends whenever they meet them, or to those who want to propagate and disseminate varieties of it true to name and description. The magnificence and beauty of coloring of this Iris, as well as its hardiness and ease of culture will, I am well assured, draw for it a wide popularity, but the compiling and publication of authentic lists of varieties are pre-requisites of any demand for it.

A few years ago Mr. Groff published the statement that in his judgment the interests of the Gladiolus would be best served by its being propagated and disseminated in collections rather than in named varieties. Had he then known that in one of his collections of hybrids there was a variety that under the name of "America" was to become famous all over the continent and very profitable to another party he probably would not have made this statement. The trade has not followed Mr. Groff in this suggestion. Named varieties have multiplied in the past five years, and Mr. Groff, has himself fallen into line with the general sentiment. His best new varieties are now named before they are put into commerce. Under existing conditions there is no check on the naming, or re-naming of varieties of this flower, or on the making of descriptions of these varieties. Consequently we have the case of the "America" a variety taken from one of Mr. Groff's hybrid collections, named and exploited by a grower and dealer greatly to his profit; and then when the variety had reached a high degree of popularity a serious attempt was made to show that Mr. Groff never had anything to do with it. We have also the case of "Harvard," offered as a new variety to the public last year at 50c. a corm by one of the large and reliable firms in the United States. Another grower and dealer protested against the use of the name as it had been used by him years ago. It is now claimed by a party who had some 1,200 varieties, including "Harvard," under observation in the past season that it is the same as "Geo. Paul," originated and disseminated by Lemoine some years ago. To add to the confusion, one of the most prominent firms in

New York offers "Geo. Paul" in a column headed "Gandavensis," while the parallel column on the same page is taken up with the Lemoine list. Cases showing this confusion of names of varieties might be multiplied. These are a few picked up at random.

I apprehend that the confusion in the descriptions of varieties of flowers arises chiefly from a lack of skill in distinguishing the blended colors. So many tints and shades and blendings of the simple colors enter into the composition of many flowers that only trained eyes can discern what color predominates and what subordinate colors enter into the beautifully blended bloom. Color charts lend assistance in the making of descriptions of flowers. A new chart published by the French National Chrysanthemum Society is said to be scientifically accurate and thoroughly practical. The popular scientific names of all the colors are given in five languages, and for each color a particular variety of flower is cited. An illustration of the value of this chart may be had by any one who will compare the descriptions of fifty varieties of Phlox made according to it and given in the November, 1905, number of "Country Life in America," with the descriptions of some of the varieties given in the catalogues. The making of color descriptions of Japan Iris is easy because the colors are simple. It is not difficult in the Gladiolus; while in the Phlox the coloring of many varieties is quite complicated and the making of descriptions is correspondingly difficult.

In conclusion, let me say that I think Canadian Horticulture is now old enough and of sufficient importance to require definite and permanent records of species of plants and varieties for the use of all who are interested in it. A standard nomenclature and descriptions of species of plants should be adopted as a basis of such records. Then recognized and authentic lists of varieties of plants should be added as they can be procured. Such lists should be in a form available to the public at moderate cost and they should be revised and supplemented as occasion may require. Lists of Roses, Carnations, Chrysanthemums, Daffodils, Tulips and Sweet Peas can be obtained without much work. An authentic list of Peonies will be available in two or three years. There are no recognized lists of Phlox, Japan Iris, or Gladiolus. I think this Association should invite some of the sister societies in the neighboring states to co-operate in the preparation of authentic lists of these three flowers. Let me remind you that scientific horticultural work is not for our own Province and country alone. If such work be worthy of recognition it is of world-wide interest, and there rests on us an obligation to do a little share of the world's garden work.

The President: As Mr. Cavers has opened up a great field for scientific research and exploitation, for which we feel indebted to him, I think that some practical means should be attempted to carry out his suggestions; but before that I would like Mr. Macoun, who is a scientific horticulturist, to say something to us on the subject.

Discussion.

Mr. Macoun: I have been very much interested in Mr. Cavers' paper, because I believe it is a step in the right direction. We have had considerable experience with flowers at the Experimental Farm, where we have been established for twenty years, so we know the difficulties in nomenclature, which are now under discussion in the Fruit Growers' Association. It was said by some fruit growers that the nursery men sent out trees that were not true to the name, and some of use have had the experience of finding trees which were thought to be of one variety turn out to be something else. We also find that very frequently we come across an old fruit under a new name. We see something very highly commended. We buy the cargo and bring the fruit or flowers to foliage and find it is something we had known for many years. At the Experimental Farm we know one variety of apple under several different names. It is a Russian. Whether the nomenclature in the past has not been given very much attention or not, it just goes to show what confusion may arise.

Mr. Cavers' paper is a step in the right direction. There is, however, some difficulty in the way of our undertaking the task which he mentions and carrying it to a successful conclusion. For instance, to make a thorough study of varieties, it would be necessary to have a library. Unless we made a complete study of all the horticultural publications from the beginning and had a very good library of horticultural science extending back for a hundred years or more, our efforts would be very incomplete indeed. The Peony Society published a large list of peonies this summer of about two or three thousand varieties (the gentleman who worked on it has done so for a number of years), and they have been finding mistakes in that list already. It would be fruitless for us to attempt to make a list with the few accessories we have. It would be better to direct our efforts to something which I think we could bring to a more practical conclusion.

We could do a great deal, for instance, at the Experimental Farm. We are at present preparing a bulletin on perennials. In this bulletin will be listed, I expect, over two thousand species and varieties of perennials. Some of our genera are not very complete. We have not a very large collection of perennials, but in most genera we have a pretty good collection of the best horticultural varieties. In that bulletin we propose to publish the scientific and common name of each variety, as far as we can, when the plant begins to bloom and how long it continues to bloom, the height to which each plant grows, the size and color of the flower. In addition to that we are going to star the different plants that are worthy of cultivation, giving three stars to the best, two to the next best, and one star to the poorest of those we recommend. This will make several lists. We will make a comparatively small list for those who have not much garden, and a larger one for those who have large gardens. We propose to give a short chapter on each of the leading classes of plants, so that when this work is completed (which I hope will be this winter) it will be a step in the right direction. But, as an Association, we could all do a great deal in the direction which Mr. Cavers has mentioned; that is, for each of us to make a specialty of one line of plant. As Mr. Whyte pointed out yesterday, let some of us take up the Iris, others the Phlox, others the Gladiolus, and others the Lily, and so on; and each of us become an authority on that one flower. Then I think we could have, in connection with this Association, a Committee on Nomenclature, so that at our monthly meeting this committee could bring before the Association the merits and any synonyms which they have been able to work out during the year; this would be published and be at the disposal of the members of all the Horticultural Societies. That I think will be a step in the right direction. Then I think we should cooperate in the best way we can with all the American Societies. Most of them have been organized for a long time, and some of them are working out lists. We could do a great deal by co-operating with the societies and giving them all the information we can. Several of these Associations, as the American Fruit Growers' Association, are international in character. They have Canadian representatives in that Society. The National Society of Horticulturalists would like to become an International Association.

Sunburst Dahlia.

Sunburst Dahlia.

Mrs. Roosevelt Dahlia.

Gladioli.

I think it is practically so now; and I dare say that there are several of the Florists' Associations which are international in character. I think by co-operation with them we could preserve our annuals better than by trying to work out for ourselves a system of nomenclature and a complete list of one class of flowers, because I do not believe that with our facilities in Canada, we could obtain what I would consider satisfactory results, because I should not like to publish under my name, what professed to be a correct list of a certain flower and then have fifty or sixty criticisms of that list afterwards. I think it would be unwise in the present history of the Society to do so; but we can do a great deal in furthering the work of the societies by having a committee on nomenclature, and we could bring forward the points which Mr. Cavers mentioned.

Mr. Hunt: I have been very much interested in Mr. Cavers' paper, and I have for long seen the necessity for some work being done along the line that has been suggested by him, and also by Mr. Macoun. There is no doubt that there is a necessity for work along that line, but I do not exactly agree with Mr. Macoun that we cannot do very much. I think we can do more than we are doing, by following in the footsteps of the Ontario Fruit Growers' Association. They have for a long time, I believe, had a committee to recommend and examine the report of the different new fruits that are introduced and that are brought before the notice of growers; and I can see no reason why we cannot, as a Horticultural Association, have a similar committee. I think that was suggested by Mr. Macoun, and I trust that it will be carried out. I notice at these meetings we have had some splendid addresses and discussions. I have been more than interested in the proceedings. I feel that the time has come when we can take some steps in the nomenclature of plants, and make some recommendation as to their suitability for culture by the members of the Society. I think, if we had a committee to co-operate with the Canadian Florists' Association, that much good might be done and that added interest might be given to the annual meeting. As Mr. Macoun has said, we canot do a very large amount of work along this line, but I think that when so many of our members are deceived oftentimes in these so-called new varieties, it is time something was done to protect the public generally. This Association can do a great deal along that line. If a committee were appointed not only to report here on the new varieties, but also, perhaps, to bring specimens of the different kinds of fruit and flowers to these meetings, it would not only create an interest, but the members themselves could bring specimens, and report on their experience, and that would add considerably to the interest of the meeting. I am strong in the opinion that if this Association undertook to appoint a good committee to act in conjunction with any other committee, either our Canadian Florists' Association or an Association on the other side. very much good might be done. There might also be a great deal of help given to those who are oftentimes disappointed in results in purchasing those so-called new varieties, and this committee might be prepared to give some certificate or authority to any new introduction that it might advise. Mr. Cavers has opened up a subject which has a very wide sphere, and we can scarcely be expected to grasp it all at the present time, but I think it would be a good thing to appoint that committee.

We are making some tests at the Ontario Agricultural College more particularly of annuals. At the present time we have not a very large scope for going into this work as we should like to do. Our students' work takes up a great deal of the time, and we have not much time for experiments, but we have done a great deal, and I hope to have the pleasure of assisting in preparing these reports on some annuals we have grown which might be of service to the public generally.

Mr. Whyte: The suggestion made by Mr. Hunt is very important Why should we not appoint a New Flower committee so that they could report on the new productions in the last three years, and every year after that let them report on every new flower during the previous year. They could purchase all the new seeds and plants, and every year report on what is worth growing, and what is the true name of the thing developed. There is one florist, I believe, who gives everything he gets hold of a new name, and, if we had a report on the names of such flowers, it would not be such a lot of work. In regard to the large question Mr. Cavers has brought up, it is a little too big. Possibly in two or three years we might be able to take up that work, but the other is quite feasible.

Mr. Burgoyne: I have a motion here on the line of what Mr. Cavers' admirable paper brought up. It may be when I have read it that you may have some suggestion to make. It may not cover the whole ground.

Moved by Mr. Burgoyne, seconded by Mr. Lennox, "that a special committee, composed of Messrs W. T. Macoun, R. Cameron, John Cavers, H. B. Cowan, and Wm. Hunt, be, and is hereby appointed to be known as the Committee on Nomenclature, with instructions to inquire into the whole question of the adoption in Canada of a standard on nomenclature and description of species and varieties of plants, including ways and means for the establishing and maintaining of such a standard, and to enter into correspondence with sister societies in this country and in some of the northern states with a view to securing the co-operation of two or more such societies in the preparation and publication of authentic lists of varieties of Perennial Phlox, Japanese Iris and Gladiolus; said committee to report at the next convention of the Association." (Carried).

Mr. Burgoyne: I think, perhaps,that if after a few years' experience, this fails to cover the whole ground we can add to their duties, but this would be a beginning.

Mr. Cavers: The idea set out by Mr. Hunt and by Mr. Whyte does not conflict with the resolution that has been made by Mr. Burgoyne. I will suggest that in this connection Mr. Whyte and Mr. Hunt should offer a resolution appointing a Committee on Novelties. This is simply a Committee on Nomenclature on existing and leading well-known plants that are known in a sense incorrectly, but there might be another on novelties, to report from year to year. The Committee named in that resolution will find that they have their hands full, and it seems to me that the committee on Novelties should be distinct from this, and therefore I would like to see such Committee named.

Mr. Dickson: There is something wrong with this renaming of old varieties. If a grocer were to send out sugar that is under weight he could be taken up and fined, but if I go to a seed store and buy some seeds, and they turn out to be something different from what I ordered, I have no redress. You buy them on their merit, taking the name on the package. I have a few plants that we bought under these conditions. I planted them out, and when they grew up, I was very much disappointed to find them with a single flower instead of a double, but we have no redress whatever, or any guarantee, and as to the matter of nomenclature that is a very vexed question. I suppose we have in the package, seeds of plants that have six or seven names to them. I could find some with no trouble to which some people give one name and others another.

A Member: The providing of ways and means is a matter of great importance to the whole country, and it is a matter on which the committee ought to memorialize the Government to give a certain amount for that purpose. It is one of great importance so far as the country and the growers are concerned, and they are part and parcel of the country; and a memorial to the Dominion and Ontario Governments, by this Committee, would have some effect and be the means of getting a grant. We require means, as we have not the money to do it; and I make the suggestion to the committee to memorialize the Government.

The President: I understand that the resolution is that they report at the next meeting.

Mr. Cavers: For the next year the Committee will not require to spend any money at all. The business of that Committee for the year would be to get thorough, accurate information. So far as the paper I read is concerned, it was prepared in very much of a hurry. I have never done so much manual labor in a year as I have done in this; and although the matter has been in mind for a number of months, the paper is quite crude in its form, being prepared in a day or two. The work of the committee named in that resolution seems to me simply a work of getting reliable information and not incurring any expense.

The motion was carried unanimously.

CITIES AND TOWNS BEAUTIFUL.

By J. S. Pearce, Parks Superintendent, London.

The idea of a city or town beautiful involves a well designed plan of the streets, of the location and architecture of the public buildings, the railway station, the parks and boulevards, the location of sidewalks, of the poles on the streets, besides a number of other minor things; all these do much to either mar or beautify the city. But there are one or two things which do as much to beautify a city as anything else. I refer to well planted streets with trees and well kept lawns and boulevards. These two do more to give a town or city a neat, attractive appearance than fine costly mansions without these. What I mean by well planted streets is a wise selection of good varieties of trees and these properly planted on the streets, the location of the trees on the streets, with the same variety in each street, has much to do with the appearance of the street. What finer effect could you imagine than a street one or two miles long, well planted with elms, then another with Norway maples, another with hard or sugar maples, another with the tulip tree or white-wood, another with the Oriental plane. Were I planting the streets of a city I would plant every street with a different variety up to a certain number, and then on the cross streets I would plant each block alternately with three or more of the same varieties. Many grave mistakes have been made in the planting of streets and parks with trees. Then the architecture of a city with the size and extent of its buildings is necessarily characteristic of its wealth and mercantile trade. The arrangement of its thoroughfares and civic centres depends more or less upon the original conditions and the city's growth. But the planting of the streets with luxuriant and shapely and well assorted trees depends more on the efforts of the individual citizen or on the arrangement of the municipal authorities.

The impression is too prevalent, I am sorry to say, that useful structures could not or need not be beautiful, and no effort is made to even make them tasty and neat. If, for instance, a bridge is made strong enough it makes no difference how it looks. More often than not, it is not even painted, and, when painted, what ugly, repulsive colors cover many handsome bridges! Could anything be more unsightly than telephone, electric light and trolley poles, and the way they are located, especially on the residential streets? Poles are bad enough on a street, but, when badly located they are then intolerable. The only parties who make any pretence at painting them are the telephone people. The color of the paint used should be regulated by the city engineer. Color has a great deal to do with the appearance of these poles.

The location of the sidewalk to the property line and kerb is important; a great many streets in Toronto have the sidewalks close up against the kerb; this looks very bad. The width between the kerb and the sidewalk will depend on the width of the street. The city engineer is responsible for most of this bad taste; he should be a landscape architect as well as an engineer. Bill boards on the streets are another very unsightly thing, and should be regulated as to the location and height, and class of matter put upon them. In many of the cities in the States these are under the direction and control of the civic authorities or some civic organization. The time will soon be ripe for a similar movement in this country. The enormous bill boards one sees on the landscape as we travel through the country either by carriage or by rail, are to me very offensive. In Berlin, Germany, all street advertising is under the control of the city, but only a neat round cylinder is allowed twelve feet high and three feet in diameter. The city has an income of $95,000 from this source. To go into detail on these various points would make my paper too long. These few meagre hints will give you some idea what might be done were all those things right. I shall be glad to hear these things discussed by the meeting. They are important.

It is very evident that there is a wave of improvement effort coming over the country. This is noticed by all close observers. The spirit of civic improvement is plainly in evidence, embodied usually in the enthusiastic members of an Improvement Society, a Civic League, or the Horticultural Society. So widespread a movement cannot fail to have its significance and great possibilities, and its dangers too. It is not putting rubbish cans at street corners, or the cutting of weeds, or the putting of flowers in vacant lots which is going to leave a mark on our towns that will be plainly visible fifty years from now. These are all right in their way, but there is no essential permanence. To illustrate, London is noted for well planted streets with trees. Planting was inaugarated 40 or 45 years ago, and the city council gave a bonus of a tree-guard for each tree planted by the citizens. There was a great fight in the council about the granting of the tree guard bonus, some of the aldermen contending that they were not there to spend money but to save it. The question finally carried, and the city to-day can bless the council for its action. Had not this been done, not one half of the trees would have been planted that were. One carpenter or contractor supplied some 12,000 of these tree-guards. Had the trees not been thus protected more than one-half of them would have been destroyed by the cows who roamed the streets in those days. London started right, though there was no supervision in any way, and, as the result, the whole city, with but few exceptions, was planted with soft or silver maples.

This country is sadly in need of the cultivation of civic art. We should plan for the future and for permanence so that, when these works of improvement are laid out and completed, they will not have to be pulled to pieces and done over. Here comes the necessity for expert plans, so that when the work is done, even if it should extend over a period of years, when it is finished, there is an end to it. How can this be done? By the town or city employing the services of a professional man with whom the work of this kind has become a speciality. In the hands of such a man, a carefully thought out plan is developed. I would like to refer to another matter, although not exactly in order, and that is the town and rural cemeteries; any system or attempt at planting these sacred places seems to be overlooked. The cemeteries in the cities are little better, and a well laid out and planned cemetery is most desirable. Let us make "God's acre" beautiful. One is saddened by the thoughtlessness which gives bareness instead of beauty in the "city of the dead." If these were well and tastefully planted with trees and shrubs, how marked would be the improvement! Cities all over the United States and some in Canada are earnestly striving after the beautiful, the artistic, and attractive. Let us not be behind them in this respect, and by all means, let those who have the laying of the foundation along these lines profit by their mistakes. Let us plan for the future. Start right. Any town of any size has its engineer. Why should they not employ from time to time a competent landscape architect? It would be money well spent and prevent grave mistakes.

With this demand for the city beautiful comes the enquiry, "Where are the men to plan and do this most important work?" Such men are few. I think it is the duty of the Ontario Government to supply one or more such men to be at the service of any town or city who might want such a man to confer with and advise, and, if necessary, prepare plans for laying out parks, boulevards, parkways, and the grounds surrounding all government, county and city buildings. If these grounds were well laid out and planted for landscape effect what an object lesson these grounds would be to every citizen of the town and also all who visited the place! How many such grounds are there to-day well laid out and properly planted? Not even Queen's Park and the grounds surrounding the Parliament Buildings. Has any effect been made in that direction. Ottawa has done and is doing a good deal along that line.

I could name you many parks and public grounds where serious blunders have been made, and all for the want of an advising landscape architect and properly made plans of such grounds before undertaking the work. I have said nothing in this paper about parks. The subject is so vast and the field so large that one cannot more than touch it, in a paper such as this. A long paper could well be devoted to this very important part of the "City or Town Beautiful." Parks are most essential and beneficial to the people. Parks are for the people, for their pleasure and enjoyment, and should be so managed that the people will understand for whom they are intended. There should be as little restriction as possible; take "keep off the grass" signs away. Allow the people to walk and stroll over the grass, but allow no making paths along the edge of walks nor tolerate short cuts. Nothing is more unsightly in a park than these. A well kept park is always appreciated by the citizens, and the neater and better it is kept the less danger is there of your regulations being violated. Make your parks educational. Have the very best and up-to-date shrubs, plants and flowers. Make your parks (no matter how small) attractive and tasty, and citizens will feel proud of them. They will talk about them; visitors who come to your town will praise them. Well kept parks, clean streets with neat tasty lawns and boulevards will give your town a standing or rating and an air of respectability of which you and every citizen will feel justly proud.

A City Beautiful.

"He wanted a city beautiful,
A city that should be fair,
A city where smoke should never roll
In billows upon the air;
He wanted a city where art should be,
A city of splendid halls,
Where culture's touch should appear upon
The battlements and walls.

"He called for a city beautiful;
He shouted it day by day;
He wanted a city where noise was not,
Where the spirit of art should sway;
He wanted a city that should be fair,
Where filth should never be seen,
And forgot in spite of the zeal he had,
To keep his back yard clean."

In our cities they should have some one who has control of the planting of the trees. I have succeeded in getting a by-law passed through the city council in London, giving me the power to say what trees shall be, and where they shall be planted on the streets, and how far apart, for it adds so much to their beauty. There are many of our streets in London which are sadly lacking in appearance because the trees are on the same angle with regard to the boulevards. In the city of Rochester the planting is unusually well done. There is also some very good planting in Chicago, but you will see any amount which is very badly done. Some Park Superintendents have the idea that they must cover the whole ground up again with the trees; this is a great mistake. Plant the trees with a view to landscape effect—get them into clumps.

I think the painting of the poles on the streets is a very important matter. The city should take this up and decide on some uniform color for the poles. The telephone people are the only ones who have painted theirs. We have streets in London on which there are three sets of poles, and these three sets are all tight against the curb. They should have been set back six, or eight or ten feet, for the streets are wide enough for that; but now when you look down the streets you see nothing but poles. Then the location of the sidewalk in regard to the curb and the width of the street has a great deal to do with its appearance. This should be regulated by the engineer, and the trouble with the engineers is that they are not very good landscape artists.

London is noted for its trees. The planting was done in the older part of the city about forty or forty-five years ago. They started in right in planting, but they were wrong in the varieties. We have nothing there by soft maples, practically. I suppose there are twenty-five thousand soft maples on the street, and there were not one hundred elms or hard maples five years ago. That is deplorable. There should have been better varieties selected. The soft maple is not a good tree. It grows too fast and it gets out of shape. They were planted so thick in London that they grew up and caught on to the poles.

Background of Elderberries.

When London got control of what is now known as Victoria Park, through the influence of Dr. Saunders, they brought a man from Philadelphia, a landscape artist, to lay out that park. They paid him $600 for the work, and it was money well spent. His planting was good on the whole, and had the aldermen lived up to that plan we should have had a very beautiful park; but there are some defects in it, owing to the fact that the aldermen took to altering the original plan. Another mistake is not putting in varieties of trees. In Victoria Park we have only twenty-three varieties, four or five hundred soft maples and a few elms and evergreens. There ought to be seventy-five varieties.

Seventy-five years ago the city of Washington employed a French landscape artist to prepare plans for that city. These were prepared and the city worked on them, then they abandoned them, but to-day they have gone back to those plans, and find they were far ahead of anything they were able to design themselves.

In Springbank Park at the water works there are three hundred acres of land, and they have planted hundreds and hundreds of trees with no plan or system, and of course it is all wrong. Had the city or the water works people employed a landscape artist to make a plan of that park, even if it had taken ten years in carrying it out, it would now have been a marvel of beauty. When you are taking these points up particularly, engage a first-class landscape artist and engineer; even if it costs the Province five or eight thousand dollars a year, it would be money well spent. He could take up the grounds for public buildings. What has been done to plant Queen's Park, Toronto, with landscape effect? Nothing whatever. Even with the public buildings and the Lunatic Asylum in London the plan of planting is all wrong. Take the Normal School. There was an effort made to plant a few shrubs there. One gentleman said the arrangement must have fallen down from Heaven. Before I had charge of Victoria Park there was a law forbidding people walking on the grass. One day I went over to look at a certain tree, but before I got to that tree a policeman was after me and told me to get off the grass. Now the citizens are allowed to stroll over it at their pleasure so long as they do not make short cuts.

Mr. McCullough: Nursery men usually recommend a soft wooded tree. That is why we see all the Soft Maples in the cities. Mr. Pearce spoke of the Elm tree. I have on my place a couple of European Elms, and it would be well for one to avoid them. It is far better to get the Native Elm. The European or English elm makes a triangle. Not only that, but it is a very dirty tree. Mine are twenty years old, and if I could change them and put in American Elms I would.

Mr. Tebbs: I think Mr. Pearce's paper is a most admirable one to put into the hands of all the Park Commissioners. In my little town the mayor has given a piece of land for the purpose of making a town park out of it The first thing that the Park Commissioners did was to obtain the services of a landscape artist, and they made the rule that his plans were not to be departed from. We have a Park Commission, and I have the honor of being one of the members of it. It is being formed into a Cemetery board. The aldermen of the town have asked the town council to look after the interests of the two. I quite agree with what he says in regard to the cutting of weeds. They are a great nuisance all along the sides of the streets. They published in the papers a while ago that the weeds had to be cut on the streets before a certain time; but, unfortunately, the corporation had not cut theirs on their own property, and the law had no weight because the city fathers did not carry out the provisions of the Act.

A MEMBER: At Niagara Falls they have a great many flowering shrubs, and I think it would be a good thing if we got the names of the shrubs so that they might be planted elsewhere, and, we would have the benefit of them.

SHOULD THE HORTICULTURAL SOCIETIES' ACT BE AMENDED, AND IF SO, HOW?

BY H. B. COWAN, TORONTO.

In order that the views of as many officers of societies as possible might be obtained, I wrote, some weeks ago, to the secretaries of all the Horticultural Societies in the Province. They were asked to confer with their directors, and then to send me any criticisms of the Act, and suggestions for changes they would like to see made in it. Only four replies were received. None of the secretaries heard from found fault with the same section or sections of the Act, that any of the other three did. This would seem to indicate that there is a general feeling that it is a little too early to criticise the Act, and that it should be given a more extended trial before it is altered to any considerable extent. This view was expressed by the secretary of one society. It indicates also, that none of the sections of the Act are giving cause for any general complaint.

One section that might be amended with advantage, is Sec. 17, which requires that on or before May 1, of each year, the officers of every society shall send to the Department an affidavit setting forth the transactions of the society during the previous year, and the number of members in good standing. This section is largely a duplication of Sec. 12. There is no reason why the societies could not furnish the Department all the information—with but one exception—called for in Sec. 17, when they are sending the Department their annual reports as called for in Sec. 12. This would ensure receiving the reports from the societies early in the year, and should make it possible for the Department to give the societies an idea at the end of March of what their grants for the year were likely to be. This would be a decided advantage. It would enable them to plan their year's work with greater confidence, as they would possess some idea of the funds they would be likely to have. As it is, they have to guess what their grants are likely to be. If they err and spend too much, the mistake may prove a severe blow. If they do not spend all their funds, their grants the following year will be proportionately less. It is most important that they know as early in the season as possible, what their grants are likely to be. This can be accomplished by embodying Sec. 17 in Sec. 12, and requiring the reports to be sent to the Department within one month after the date of the annual meeting.

The exception in Sec. 17, referred to, is the sentence requiring the societies to send the Department by May 1st, a statement of their number of members in good standing. The object of this clause, is that the Department may have proof that a society is still alive and doing business in accordance with the requirements of the Act, and that it is entitled to receive its Government grant for the current year. The grant for a year, to the societies, except a portion of the grant to the four city societies, is not based on their number of members in good standing on May 1. The intention of of the clause is to prevent a society whose membership may have fallen to a number less than that mentioned in the Act, as the number required to entitle it to receive a grant, from receiving it. It, therefore, is an important provision.

The objects of the Act would however, be accomplished equally well, were the date by which the affidavits as to the number of members of the society for the current year in good standing must reach the Department advanced from May 1 to July 1. Many societies secure the greater number of their members between these dates. The change suggested would not be likely to inconvenience the Department in any way, and it would be a great advantage to the societies. Then, if the Department found that the societies had the required number of members on July 1, there would be nothing to prevent the Government grants being distributed immediately. Should any of the societies not have the required number of members by July 1, it is to be presumed that their grants would be cut off and distributed among the others.

It seems rather unfair to city societies, that in Clause (*c*) of Sec. 19, a portion of their grant is made to depend upon their number of members on May 1 of the current year. It would be better for them were they to receive all their grant on the same basis as the other societies, that is in proportion to their paid-up members during the past calendar year. If this change cannot be made, it would be well to have the date extended to June 1 at least, although such a change is open to the objection that it might tend to delay the distribution of this special grant to the four societies concerned. It is probable that the Department would be willing to fall into line with the desires of the societies concerned, were they to make their views known.

The only other clause that seems open for improvement is the one which caused so much discussion last year, namely Clause (2) of Sec. 9, which stipulates that a society shall not expend more than one-third of its funds in any one line of work.

Some of those who object to this clause claim that societies know best what is in their own interests. That is just the trouble, they know too well. The object of this clause is two-fold; first to prevent them getting into ruts and confining all their efforts to one line of work, and, second, to prevent as far as possible, the members of some of the smaller societies from expending their funds mainly for their own benefit, such, for instance, as using nearly all the funds of the society to buy plants, shrubs, and seeds for themselves, or by holding only one exhibition in a year and arranging the prize list so that most of the money would fall to the portion of a certain few officers or members. While the great majority of our societies are above such actions, others are not.

While it is not likely that the Government would enforce this clause in an arbitrary manner on a society which is doing good work, and working in a manner that the members believed to be in the best interests of their section, the feeling that this clause should be changed appears so strong that it may be well to alter the wording of it in a manner that, while not weakening the intention and power of the clause, will give the societies a little more more latitude. I would suggest, therefore, as a basis for discussion, that it might be amended along the following lines.

9.—(2) "A society, after its legitimate operating expenses have been deducted, such as funds used for the purchase of stationery, and postage, the payment of hall rent, printing and advertising bills, and other similar expenditures, shall not expend more than one-third of the remainder of its funds for any one of the lines of work mentioned."

The wording of the foregoing clause is far from perfect, and is offered only as a suggestion. It permits of a considerable diversity of interpretation. We should remember, however, that the final decision on any point of doubt or dispute arising in connection with this Act must be left to the Minister of Agriculture and we can depend on him to see that the Act is not interpreted and enforced in a manner that will work a hardship on any society that is doing meritorious work.

In conclusion, mention should be made of a suggestion made by the secretary of the Ottawa society, who asked if it would not be a good idea to have the annual meetings held early in November, instead of January. This proposal has some very good points. Were the annual meetings held in November they would be more likely to be well attended, the new officers would have longer in which to plan their work, and the Government would be able to give them, not long after the beginning of the year, some idea of the probable size of their grants. It might be well for this Association to discuss this matter fully, and if the idea is approved, unless there is some strong Departmental reason against it, press for an amendment in the Act that will permit of the holding of the annual meetings of the societies in November, instead of in January.

On motion of Mr. Diamond the report was received

Mr. Diamond: I agree with the secretary in everything except the suggestion of the clause, subsection (2) of sec. 9. I do not exactly understand it that we, as secretary-treasurers, have to make an affidavit. So far as I am concerned, I have endeavored to keep within the truth of the declaration required. This says that we have confined ourselves to the expenditure of the money as provided by the Act. That section "The society shall not expend any more than one-third in any one of the lines mentioned" should be eliminated, because subsection (3) says: "None of the funds of any such society, however derived, shall be expended for any purpose inconsistent with those mentioned. Societies violating any of the provisions of this subsection shall forfeit all claim to the Government grant." Now, coming to the question of making a declaration it is very important. I shall not do it. I did object to making this last declaration, and I would score out that portion which says we are required to make it; but I made it in the annual report. I do not want to go beyond anything which is an actual fact; and I cannot make that declaration that the money last year was expended one-third in each department because it was not. I do not think there is a member here or a representative who can make a declaration of that kind. Of course, as far as the officers are concerned, there is only one officer who has to make that declaration, and that is the secretary-treasurer. However, I think the societies are in a different position in every section. You cannot hold a fast line on all the sections; you have to give them a limitation. You have to give them an expansion on which line should be the most useful for the furtherance of horticultural purposes and for the promotion of horticultural interests; and, therefore, I submit that that is a binding thing, and we cannot, in our idea of expending our money in other directions, say to the Government we did that, and we want you to be liberal with us, notwithstanding that we did not comply exactly with that section. Our society is unanimous in asking that that portion of the Act should be amended. Of course, if you do not want to say that all the money shall be expended as the society desires, it should not be so worded that we should not spend more than one-third in any department. I feel very strongly on it. When they want me to swear to an affidavit that I cannot conscientiously do, they will have to get a new secretary-treasurer, so far as

I am concerned, and I have been secretary-treasurer ever since the Belleville Horticultural Society started—and that is away back in the sixties. We have endeavored to do what is right. If we have been wrong, we were doing what we thought was right in the interests of getting memberships.

Mr. WHYTE: Our society held a meeting to instruct our delegates who have come up here; and I am happy to say, after hearing the secretary read his paper, that we heartily support it. The chief point was in regard to the May statement. The other is the great advantage it would be to every society in the country if they could know what their grant was to be at the end of February. We have mapped out our work for the year at that time; and as we do not know what the grant may be then, we may be $100 out, and will have to go into debt, if that is the case, which we do not want to do. We do not want it paid at that time; but if we could know what the amount was to be, so that we would know how to gauge our expenditure, it would help us. Another point is the city grants. It seems to us unreasonable that the grant to the cities should be divided on the basis of current yearly membership. Why not do as you do with the other two divisions of the grant—base it on the membership of the previous year. With regard to what Mr. Diamond said, would not it be an easy way out of it if we said: "The expenditure should be one-half on any one subject mentioned because they are all justified in expending money on each one." It is not necessary that we spend one-half; but they could then make their declaration, and I make that one suggestion in opposition to Mr. Cowan's paper. That the Act would then stand, and be satisfactory.

Mr. DIAMOND: Would you strike out the $800 entirely?

Mr. WHYTE: No; with the exception of these two small items it is all right. I might say in regard to a few of the members that the meaning of one-third might be construed as one-third of the Government grant, and not the total receipts of the society.

Mr. STEVENS: I wish to speak on the clause which prohibits the united action of two classes of societies. Now, that has a most disastrous result on the Horticultural Society. At our Annual Fall Fair the Horticultural Society undertook to run the horticultural part of it. Nobody else had anything to say regarding the prizes. They paid prizes that were satisfactory to the whole county. Twenty years ago, when that began, the Agricultural Society had a horticultural exhibition, and this table would hold it. Now, this year this room would not hold it; and, by my persuasion, the Agricultural Society donates the prizes to the horticultural exhibitions. This year the show was most successful.

Mr. BURGOYNE: I think that clause is the one that causes the most anxiety to the members of a Horticultural Society. There would be some advantage in knowing earlier in the year what our grants are in order that we may more accurately know what we can spend for this year or that purpose. Resting upon the assurance that Mr. James gave us last year in regard to the manner in which the Department would interpret the Act, we had no fear in going on with the exhibition. We had begun a large exhibition the year previously, and we would not have felt like carrying it on this year if we were limited to the wording of the Act. If the Department were inclined to be arbitrary, it would be impossible to carry on any such exhibitions in the Province. We have to trespass a good deal upon the liberality of the Department in interpreting the Act. At our exhibition in September our entire expenditure would not be less than $1,500, whereas our whole expenditure for the year was $2,500. Three-fifths of our entire receipts were expended on one exhibition; yet we would not want to have it otherwise.

We could not expend any less on that exhibition and have it the success it was and which we hope it will continue to be. I am glad Mr. James was present and saw the exhibition, and I am sure all who did see it felt it their duty to say that it was worthy the efforts of any society. If that clause were amended just by adding the word "except," in subsection (*b*), for the exhibition work, it would meet with no criticism whatever. I do not think any society would feel like expending more than one-third in any other line of work. Make an exception of that one clause and it would free the society of any anxiety.

ADDRESS.

By C. C. James, Deputy Minister of Agriculture.

After a few introductory remarks, Mr. James stated that he would take up the points referred to in Mr. Cowan's paper and would give his opinion in regard to them. He thought that all the suggestions were quite reasonable and that, unless some unforeseen difficulties should arise, they could be embodied in a Bill which the Minister, no doubt, would be pleased to present to the Legislature. He suggested that the sense of the meeting be taken and a draft of the resolutions be handed to the Superintendent.

First: two reports are required, one to be made immediately after the annual meeting, and another on May 1st. The first report must, of course, be made giving the record of the reports made to the annual meeting. The other, embodied in the affidavit, is to show that the society is a going concern in the current year and is qualified to receive a grant for the expenses of the current year. I see no reason why the affidavit as to work done should not be made immediately after the annual meeting, and as soon as the society are in possession of enough new members to qualify under the Act. The putting it off to May 1st was partly intended to allow the large city societies to get in their full list of members, in order to permit of the dividing up of the $800 provided for in section 19 (*c*). If that $800 also is divided, as suggested, on the work of the previous year instead of on the basis of members in the current year, it will simplify matters and enable us to divide up the $800 much earlier in the year and apportion it among all the societies so that they would know in good time what they are to receive.

As to the clause limiting the expenditure in any one line to one-third of the total receipts, section 9 (2), I can only say that if you think that should come out, we will try to have it changed. We have not been exacting in regard to that this year. St. Catharines, which put up such a splendid exhibition in early fruits and flowers, would have been handicapped by its enforcement. You will understand that a society, if unhampered or unrestrained, might decide to expend all of its funds directly upon its members; for instance, in subscriptions to periodicals. That would not be carrying out the spirit of the Act, which is intended to do good to each community, spreading the benefits over as large a number as possible.

With regard to the time of the annual meeting, I would be in favor of a change. I would suggest holding the annual meeting in the first week of November. If your societies had all held their annual meetings the last week,—just the week preceding this meeting it seems to me that you would have had a larger representation at this meeting than you now have. It must have been a little difficult, with the annual meeting held last January, in some cases to get the proper authority to come here, and there may be a great many other societies who have not members here, because there was no recent meeting of the society. If the annual meetings were held in October or November, you might look for representatives from every Horticultural Society in the Province.

Mr. Stevens has told us that the separation of the Horticultural Societies from the Agricultural Societies has not worked well at Orillia. There may be such cases, but, on the whole, I think this change is along right lines, and I would not like to see a return to the former order of things. In the early days these Horticultural Societies were gotten up mainly to provide the fruit and flowers and vegetables for the annual exhibitions of the Agricultural Societies. We have got away from that. We have organized and are now organizing co-operative fruit growing associations and associations of vegetable growers to look after such matters, and these Horticultural Societies are concerned largely with town and city improvement schemes, and I think you can best work out your plans on strictly independent lines.

Let me, in conclusion, refer to two other subjects. There has been inaugurated by the Department of Education and the Department of Agriculture a new work which may, in the future, have an important bearing on the Horticultural Associations. As you, no doubt, have seen through the press, we have started this year special agricultural classes. We have selected six men specially qualified and placed them in six towns in Ontario, attaching them to the work of the high schools, with the hope of establishing classes in these high schools. It will be some time before a class of any size is worked up; but, in order to lose no time, and to get a proper foundation for that work, we have taken the following steps: We have opened an agricultural office in each of these towns. The young man who is in charge of this work keeps open house and has facilities for undertaking investigations and supplying information to any farmer or townsman who may call upon him. These young men have been advised to get into close co-operation with such societies as your own, and the work that they are undertaking at Morrisburg, Lindsay, Perth, Essex, Collingwood and Galt promises so well that I have no doubt in a few years we will have this carried on much more extensively. Our hope is that before long we shall have one of these in each county of the Province, and these offices will be the centre where they can meet the officers of Agricultural Societies, of Horticultural Societies and of Farmers' Institutes, and much work can be undertaken through these offices which cannot now be met by the Department. For instance, in the town of Morrisburg one of the first things undertaken there was to take charge of a large plot of ground which had been purchased. The Department representative was asked to lay it out for school grounds and a town park. That is work calling for the help of a Horticultural Society. You will see then that ultimately we are hoping to give material assistance to the horticultural work of the Province through the establishing of these offices. If you should be so fortunate as to belong to a horticultural society where one of these offices is, I bespeak the hearty endorsement of the work of the teacher in charge and that you may be able to use his services for the furtherance of your work.

The other point is this: One of the most important matters for your consideration is the improvement of the school grounds of the Province of

Ontario. I think one of the most lamentable sights in our Province is the condition of the average public school grounds. A more unattractive place I do not know. As a rule, there is no other public institution in connection with our whole municipal organization which is really so discreditable to the country as the surroundings of our public schools. I know there are exceptions, and I could take you to a few public schools which are models, which are unsurpassed for attractive surroundings, but I am speaking of the majority, and more particularly those in the small towns and in the rural parts. There is some civic pride aroused in the cities to make the school grounds attractive, but you would not have to go far from Toronto to see some school grounds that presented, in appearance, little or no attractions. You would not want your boys or girls to be brought up at home amid such surroundings. You would see that there was some neatness, some attractiveness about the grounds of your own home, yet when the boys and girls go from home to school they go to a place where the building is badly situated and the surroundings unattractive. I have no doubt but that some of the objection to going to school is due to the unattractiveness of the place in which they are educated. There is an important work for your society in assisting in the improvement of our school grounds and buildings. I have no doubt that the active Horticultural Societies are seeing to it that this work is not neglected in their towns, but we have a great number of school buildings outside of your influence, and the improvement of rural schools and their surroundings is a question that is at the present time giving much concern to those who are interested in the welfare of our educational system and in the improvement of the youth of the country. We are hoping that something will soon be done.

Mr. Burgoyne: We have all been delighted with the address of Mr. James. We feel that this matter can safely be left to a committee or to the Board of Directors, and I shall, therefore, move that the paper read by Mr. Cowan be referred to the Board of Directors to consider the advisability of making any changes in the Act. In regard to having the annual meetings earlier, our own society has felt the need of commencing on next year's work at an earlier date than the annual meeting comes on. At the meeting of the directors we appointed a special committee to prepare the plans for next year and to get them so advanced that when the annual meeting is held it will simply be an endorsement so that they can begin the work at once.

Mr. Whyte: I have much pleasure in seconding the motion.

The President: It has been moved and seconded that Mr. Cowan's address on the Horticultural Societies Act, and all proposed amendments to that Act, be referred to the new Board of Directors with power to act. Carried.

PÆONIES AND HOW TO GROW THEM.

By R. B. Whyte, Ottawa.

The plant family to which the pæony belongs is known to botanists as the *Ranunculaceæ*, and embraces such widely different flowers as the buttercup, the columbine, the clematis, the monk's-hood, the larkspur, and the hepatica. The pæony group contains 27 species, chiefly from Europe and Asia, only one being from America, *P. Brownii*, from the northwestern States, a single red flower of no horticultural value.

All our double garden pæonies are derived from the following four species:—*P. Tenuifolia,* in single and double, of these the double is by far the best, with a beautiful brilliant crimson fully double flower and very decorative foliage; the earliest of the pæonies to bloom in May, *P. Officinalis,* also in single and double, can be had in three colors, dark crimson, white and rose. This is the oldest form in cultivation, having been grown for hundreds of years—the "Pæony rose" of old gardens. This is also probably the most extensively grown of all Pæonies. In season, it closely follows the *Tenuifolia,* and lasts from the middle of May to early June. *P. Albiflora,* or *Sinensis,* as it is sometimes called, is the parent of all our fragrant pæonies. It is found of every color known to the family, from purest white and pink to dark crimson. Some of the new varieties, so very beautiful in color, are defective in fragrance, but the perfume of most of them rivals that of the rose.

Trillium Grandiflorum and Erectum.

P. Moutan, the tree pæony, I have not grown, but from what I have seen of it, I would not recommend it for general cultivation. Many of the varieties are very beautiful, but in no way superior to our best herbaceous sorts, and they are very much more difficult to grow. The flowers are soft in texture and easily injured by wind and rain, and the plant is tender, requiring very careful protection to carry it through our winter.

None of the other species can compare in horticultural value with these four. Some of the others, as *P. Decora, P. Arietina, P. Paradoxa, P. Anomela, P. Peregrina,* can be had in several colors, but the best of them are inferior to the single form of *Officinalis,* and *Albiflora,* as garden flowers.

THE PÆONY'S POPULARITY—WITH REASONS.

The present popularity of the pæony is of recent growth. Some forty years ago the *Officinalis* group was much grown, and a few varieties of *Albiflora,* about twenty-five sorts altogether being known to horticulturists. But, in recent years, there has been an enormous increase in the number of varieties, the Cornell check list, published last year, naming over 2,700 kinds. Many of these, no doubt, are the same varieties under different names, but the number of distinct varieties must be well over 2,000. This great growth is largely owing to the patient efforts of a few French and English horticulturists, prominent among them being the firm of Kelway & Son, of England, whose catalogue contains 729 varieties, most of them originated by the Kelways themselves.

Summer Sunshine.

The qualities which give the pæony its popularity with all classes of growers may be briefly summarized:—beauty and fragrance. The bloom of the pæony is beautiful at every stage of its growth. The pæony bud, as the color begins to show against the dark green case enveloping it, is as beautiful as the finest rose. At every stage, this beauty is maintained, so that the pæony bed may become the most highly decorative spot even in the most elaborate garden. There is no plant that yields a greater variety of color or more beautiful tints in a single bloom. The eye is pleased no less with the shape of the pæony blossoms, in this respect, it is next to the rose in beauty. In fragrance, no bloom is to be preferred to the pæony, even the rose, with its delightful perfume, being no finer.

As to the durability of foliage, the pæony is a better friend of the gardener than almost any other plant that can be chosen. Many of our finest blooms grow upon plants which are decorative only for a short time during the season, but which wither and become anything but ornamental as soon as the season's bloom is over. Not so the pæony, but from the day the leaf buds show above the soil in the spring, until the plant is cut down by the frost, it is a thing of beauty. The leaf buds as they first show above the soil are of a fine crimson, and thus in the early spring as they strike the eye in contrast with the brown earth, they give almost the effect of bloom. As the plant grows, the crimson changes to a dark, rich green, and this color is maintained undimmed while the season lasts.

Durability of the Plants. The pæony, unlike many perennials, will grow in full vigor, yielding the very best results without replanting for many years. One of our members who exhibits pæonies every year and always takes prizes, cuts his best blooms from plants that have remained in one place for twenty years. Where there is such a rush of work as there is in a Canadian garden, owing to the rapidity of our season, this durability of plants is a strong recommendation.

Hardiness. The pæony may have rivals in all its other good qualities, but in this quality of hardiness it stands alone. Any person who has wandered through a pasture in early fall knows that, however short the other plants are cut down by the cattle, the buttercups, are left untouched. Insect pests are equally averse to the buttercup's garden cousin, the pæony. Nor do fungous diseases affect it. Those who grow Pæonies most extensively find that, of late years, some kinds of fungus have begun to attack the pæonies. What this may develop into in the course of years we cannot say; but, for the present, and for the purposes of the ordinary gardener it is safe to say that, when every other plant has to be tended and protected from enemies, the pæony bed will be amply able to take care of itself.

Profusion and Duration of Bloom. Everybody knows what a glorious outburst of color a pæony bed is. Not everybody is aware, however that pæonies will yield bloom during all but the earliest spring and late summer seasons. With proper selection of varieties, the gardener can have pæonies in full bloom from the first week in May until the middle of July.

As Cut Flowers. Very few flowers from the garden make so good a show when cut as do the pæonies. Half a dozen large and perfect pæonies in a suitable vase form an object the beauty of which it needs no artist's eye to discover. Nor is their beauty so evanescent as in the case of many other flowers. If you wish to use pæonies as cut flowers, do not wait for full bloom. Cut them just when the buds begin to expand. When so taken, they will keep their freshness a week longer that if cut even a day later. Where the blooms are to be shipped away, it is better to cut them just as soon as the color begins to show.

Adaptability. As a show flower, the pæony has great advantages. It gives splendid returns for special care shown in its cultivation. If a specially fine bloom be desired, the beauty of many flowers can be, at least in part, concentrated in one by cutting from the stock all but one bud.

Vitality. All the world may love and cultivate the pæony, for it has a quality which enables any of its many varieties to grow anywhere. Wherever the parcel post carries, a pæony root from any garden can be sent in safety. The roots have wonderful vitality and can be planted with confidence even a month after they have been taken from the ground.

CULTIVATION.

Soil and Preparation. It goes without saying that, when a plant is to remain in one place for twenty years, it is desirable to make the initial conditions as favourable as possible. Plants with thick, tuberous roots, like the pæony, must have plenty of food if they are to give the best results. The soil should be light and friable. If the natural soil be clayey, it is better to mix sand with it. Take out the soil to a depth of at least two feet, fill up with 8 or 9 inches of well rotted stable manure, and, on top of this, the friable soil already referred to.

" A Grape Arbor." Phlox Berenice in foreground.

Time to Plant. The American growers all recommend planting in the fall, September being the month chosen. Under Canadian conditions, this is a rule with exceptions, which exceptions should be noted. The object of planting in the fall is that the plants may make roots before the end of the season of growth, and that a year may thus be saved in making a pæony bed. If the plants be procured from any grower in America, they should be planted in the fall, for the plants are ready in August and can be had while there are still four or five weeks of the growing season. But pæony roots grown in Europe, whether in Britain, France or Holland, are not ready early enough in the fall to be brought to Canada and planted in time to make root growth the same season. There is no advantage, and there may be some danger in planting such roots in the fall. Spring, in the countries named, opens earlier than with us. The pæony plants produced by growers there can be prepared and sent out early enough for our purposes. If pæonies are to be planted in the spring, it is well to get them in just as early as the ground can be worked.

Where and How to Plant. The pæony, as I have already suggested, is a most adaptable plant. It would give good results whether grown singly or in rows, or in clumps, or in beds. There is no handsomer border than one of pæonies. My own opinion is, that they show to the very best advantage if planted in clumps of two or three plants as part of a border. pæonies must not be crowded. At least three feet must be allowed between the pæony plants, and four feet, where it can be afforded, is even better. Where they are used for a border or a bed, other plants should be used in order to give continuity of bloom. A good plan, I find, is to plant narcissus and lily bulbs between the pæonies. The narcissus gives very early bloom; then come the pæonies for their long season; and, before they have finished blooming, the lilies have pushed their tall stalks above the pæony plants, and their blossoms last for some weeks after the pæonies are done. The foliage of the pæony, as I have already indicated, is always beautiful, and the plants are so luxuriant that, though standing three feet apart, they give an effect of fulness to the bed. In planting, there is only one point that needs to be specially noted. The crown of the root, the "eye" as it is sometimes called, should be wholly under the surface of the ground. The best results will be obtained by having about two inches of soil over the crown.

Fall Treatment. The pæony requires little attention during its season of growth, but it generally rewards good treatment in the fall. The only injury to be feared during the summer is from storms. The splendid double flower is itself a rather heavy load even for so stout a stalk as that of the pæony. Should this flower be filled with rain, it may more easily be blown over, and the stalk so sharply bent as to suffer injury. Where this danger exists, a hoop supported on three stakes at the height of about 1½ feet from the ground should be put around the plant. As to the fall treatment, two objects are to be sought. The first is to afford nourishment for the next season, and the second is to guard the root—not against the winter frost, for that is not an enemy to be feared, but against the alternate thawing and freezing of the early spring. These objects are attained by covering the roots generally with well-rotted stable manure. Let this covering be not less than 4 inches deep, 6 inches is better, and, in order to make sure that the whole plant is covered, let it be not less than 18 inches across.

PROPAGATION.

For the purposes of the average gardener, the propagation of the pæony is from the root. Forgetful of the fact, that pæony roots are worth money, the grower, desiring roots for planting, is apt to attack the plant from above with the spade. He gets the roots he wants, but he destroys more than he takes, and he injures the plant more or less. A better plan is to dig down beside the plant until the roots are exposed, and, then, with a sharp knife, cut off the desired bud. Where it is desired to remove the whole plant, it is better to dig all around it and take it out altogether. It can then be cut in sections with one or more buds in each piece, but be careful that the buds are not injured in dividing. Should the "eye" or crown be destroyed, the root will not necessarily die, though that result is likely to follow, and, at the very best, the root will take a year to grow a new eye, and only after this will it push its way into full growth. If a pæony plant is to be removed, make sure that the job is thoroughly done, otherwise, pieces of root that have been left will assert themselves in future seasons, probably at times when there is no means of knowing of what variety they are, and thus names will be confused. I believe that this is one of the causes for the many names of varieties of pæonies. Plants growing up in unexpected places have been taken as new varieties, though they are, in fact, simply specimens of varieties already well-known.

Propagation of pæonies from seed is a slow matter, and, unless one is able to find pleasure in the work itself, it will hardly repay the trouble. But, for one who delights to originate things, few more interesting employments are to be found than growing pæonies from seed. The chances are all against producing anything worth while, but this contrasted with the delight of giving to the world a really desirable new variety only adds interest to the work. Gather the seeds as soon as they are ripe, and store them in sand over winter. Plant early in the spring in soil prepared as for planting roots. It takes four or five years for a pæony to grow from the seed to the blooming period. Do not be disappointed if the plants thus grown turn out to be not worth propagating; and do not put a new variety on the market unless it has very clear advantages over those already in existence, for there are far more varieties now than the world can find real use for.

"The Long Path." Phlox Fille d'Eve in foreground.

VARIETIES WORTH GROWING.

It is a difficult task in the face of 2,700 varieties, to pick out a dozen and say these are the best. The following list, taken from my own collection, I know to be good. I have shown it to several pæony growers, and while all do not agree with me as to the whole list, they admit that they are twelve good ones. In addition to the list, it is worth while, as lengthening the season, to plant four May flowering varieties I have mentioned, *P. Tenuifolia,* double crimson; *P. Officinalis rubra,* crimson; *P. Officinalis albaplena,* large and handsome double white; *P. Officinalis rosea plena, rose pink similar in* size and form to the white one. These are comparatively inexpensive varieties, the four can be bought for about $1.35.

LIST OF TWELVE JUNE FLOWERING.

Madame D'Hour. Upon the whole the most satisfactory pæony I have, very large and free bloomer, flesh color tipped carmine, last year fully ¾ of the plant was covered with bloom.

Jules Elie. Silvery pink, very large, looks more like a chrysanthemum than a pæony.

La Rosiere. White with yellow centre not quite double but a remarkably free bloomer, so covered with flowers that the leaves were barely visible. very sweet perfumed.

Queen Victoria. White with yellow centre, red stamens.

Festivia Maxima. Very handsome, white tipped Carmine.

Lady Lenora Bramwell. Silvery rose, very free bloomer and very fragrant.

Mani Lemon (L.). Flesh color changing to white.

Duke of Wellington. White with yellow centre.

Floral Treasure. An American variety, soft rose.

"Apple Blossom Time." May flowering Tulips in foreground.

Clair Dubois. Light Rose, very large and late bloomer. Last year we had fine blooms as late as July 15th.

Asa Gray. Salmon Pink, very large and fine form.

Rubra Superba. Purplish crimson, the best of the dark colored June bloomers, that I have seen.

They are all fairly moderate running from 25c. to 75c. each. It might be interesting to give a list irrespective of cost. Kelway & Son, of Langport, England, are probably the greatest pæony growers in the world; they are certainly the most expensive. I have selected from their catalogue.

Lady Curzon. White and cream.

Miss Salway. White, sulphur centre.

Zephyrous. Blush and sulphur.

Baroness Schroeder. Flesh.

Lady Beresford. Soft blush pink.

Glory of Somerset. Soft pink.

Agnes Mary Kelway. Rose and yellow.

Sainfoin. Soft rose.

Bunch of Perfume. Rose.

Limoul. Lilac Rose.

Sir T. J. Lipton. Rosy crimson, golden stamens.
Don Juan. Purple.

This dozen would cost about $19 laid down, freight and duty included. It is not a tremendous sum but seems high to the ordinary pæony grower. From the descriptions given in the English horticultural papers I think it is as fine a lot as can be bought at any price.

I have not had much satisfaction with single pæonies, but from all accounts they are getting to be very popular in Great Britain. If you want to get the best they are almost as expensive as the list I have just given of doubles. The following dozen from Kelway's catalogue would cost about $18 laid down.

Tall Leopard's bane. (*Doronicum plantigineum excelsum*).

Bridesmaid. White.
Queen of May. French white.
Lady Lillian Ogle. Blush white.
Lady Wimborne. Blush.
Hesperus. Pink.
Mrs. Ida Chamberlain. Light rose.
Argus. Bright rose.
Amiable. Cherry rose.
Flag of War. Blood crimson.
Stanley. Maroon crimson.
Millais. Maroon.
Autumnus. /Purple.

The President: It does not seem to me that there is much more to be said about this very charming subject. I am sure you will agree with me, that we are all bountifully repaid for coming here just to hear Mr. Whyte's address on pæonies. We must not forget, however, that there are other gentlemen present who are waiting to address us on other subjects.

GROWING FRUIT ON A CITY LOT 66 x 99.

By Alex. McNeill, Chief of Fruit Division, Ottawa.

The Ontario Horticultural Society is to be congratulated on its growth, almost phenomenal, since branching off from the parent society, the Ontario Fruit Growers' Assocatiation. Many of us hesitated to make the break, fearful that neither the time nor the men had arrived to make the venture a success. The energy and organizing faculty of Mr. Cowan, and of those whom he gathered around him, have completely vindicated the wisdom of the move. The society is doing a splendid work, in a field large enough to absorb all its energies for many years to come.

Our Ottawa society, of which I have the honor of being a junior delegate, has continued its growth and is increasing in vigor and usefulness with every succeeding year. New blood is being introduced and everything is working harmoniously with the determination not expressed but fully understood, I believe, to keep its place well towards the head among the local societies.

In dealing with the subject of fruit growing in a small city back yard, I am limited to a space of 66 by 99 feet. Exclude the surface covered by the house, and the space is not large. You will readily understand from the object of this Association, as set forth very concisely by the President and also by the Deputy Minister, Mr. James, that the idea I have in view is not the sordid one of making money; commercialism gives way to æsthetics. I do not propose to treat fruit growing this afternoon as a money-making scheme, except quite incidentally. I propose to take it up as a rational recreation for body and mind, as a most commendable feature in home-making and as the means of a liberal education for young and old. I was pleased to note the forward movement dealt with by a previous speaker with reference to unsightly school grounds and neglected school gardens. I am confident of this, that the education of the future will be almost as largely concerned with Horticultural matters as the education of the past has been with the dead languages.

At the revival of learning, in the fifteenth century, the science of education was so little understood—if indeed it can be said to have had an existence at all—that it was impossible to use anything less crude, as an instrument of education, than language. And from that time to this, notwithstanding the growth of modern learning, language has occupied a disproportionate place in all schools except a few poorly equipped, or equipped by private generosity as a protest against an order of things that should have been long since discredited. I hope to see the time when a garden will be an essential feature of every school, not alone for the purpose of turning out more and better farmers or fruit growers, but to broaden the outlook, train the intellect and quicken the sympathies of every boy and girl born in Canada. To bring about this "consummation devoutly to be wished," our Society must perform its part. We must endeavor to have every man and woman, girl and boy, interested in the growing of things in some plot of ground. My point of view is, I hope, clear. Nor do I desert my position when I point out how recreation may be had, delightful alike to body and mind; how the household finances may be eased, as quarts of currants and pecks of apples are harvested, and how the science of dietetics takes on a certain æsthetic value when practised on the luscious strawberry.

The problem this afternoon is not with the ideal city back yard, which as we will all admit should be large and generous; we have to do with the small back yard. My friend, Mr. Whyte, who is responsible for having this subject upon the programme, insisted that I should get out a diagram and have it here before you, and if what Mr. Whyte intends to have done, is not done, you may be sure there are very good reasons for the failure.

A diagram implies a certain fixedness of design and purpose. It implies that we are all built upon the same lines. If I had a design that pleased me on paper, I am sure it would not please me in the actual working out of it. Nevertheless, a design is a good thing, but only when a man can make one for himself. I hope to increase the enthusiasm of some who may be here, but I would scarcely wish you to start with a regular diagram. Start with a few shrubs or trees, and as your knowledge and experience grow, add more till your grounds are full. A specific design would be in the way. I propose to deal with a few general principles—to give a few hints and some facts that may encourage the beginner. I am presuming that most of the lot will be occupied by the buildings. Put the ground at our disposal in square feet. It looks bigger. 40x60 means 2,400 square feet; and if you are skilful you can have one plant on each square foot quite nicely; two thousand four hundred friends to care for and culture into perfection. But don't attempt them all the first year.

As to the kinds of fruit, there is a wide choice but yet a limit. What fruit will you grow in this back yard 40x60 ft.? You can grow apples, plums, cherries, small fruits of all kinds, but you cannot grow them in large quantities, nor can you grow them all by the ordinary field methods. I would certainly advise you to grow apples, but grow one tree only as a standard and graft as many kinds on it as you wish. Choose a good grower, such as the Tolman Sweet, for the stock. For varieties I would of course advise some of the rarer fruits, noted for excellence, but requiring too much skill and care for commercial orchards. A large tree such as this, will take the place of an arbor as a shade tree, and furnish an interesting means of having different kinds of apples on a single stock. Place it against the south boundary so that it would not take up a more desirable place in the north, where it would shut out the sun, for sunlight is a valuable asset in this small lot. A better plan, wherever the climate will admit of it, is to grow dwarf trees either on Doucin or on Paradise stock. The first will give splendid results trained on cordons, as they do in garden culture in Europe. The Paradise stock will give you a tree not much larger than a tall currant bush, but the very finest specimens of fruit. These can be grown two to three feet apart, and will be an endless source of pleasure to the garden lover. Pears as dwarfs are also favorites—in fact all kinds of fruit can be grown as dwarfs provided one makes a study of their special needs in this form.

In these niceties of culture, Canadians are much behind the best gardeners of the old countries. We often pride ourselves in Canada and America that we are a little ahead of the people in England. In some things we may be, but in this we are behind them. In the pruning of fruit trees and in getting the most out of the least possible space, we must confess ourselves yet in the A. B. C. class. There is here an opening for horticultural societies. If they live up to their mission they will develop in their members that nicer side of the art of pruning and training trees, and from these centres the principles to be practised will spread finally to commercial orchards. These are sadly in need of better methods, the extremes of which could be practised in city lots. A great deal of good can be done for commercial horticulture if each horticultural society becomes an example, and perhaps a demonstration of the best methods of intensive culture.

Dwarf apple and pear trees will give you fruits that are simply surprising, both as to quality and size. With the growing prosperity of our Canadian towns and cities, and with the increased love for rural pursuits in those who are obliged to earn their living in the city, it is easy to predict that amateur horticulture will form the recreation of a much larger number of people than ever before. The very success of this organization indicates the growing interest in amateur horticulture. The connection between fruit and flowers is so intimate, that almost of necessity with the increased attention given to landscape gardening and flowers, will come the growing of the choicest of fruits. Indeed, judging from the specimens which we see at the very best of our fruit growers' exhibitions, I can say with all sincerity that there is ample room for the development of a higher taste in fruits than is shown at the present. This development into the higher branches of fruit growing will commence with the members of your association, and this will naturally turn to dwarf fruit trees. The possibilities of these are so great, there is no form which taste can suggest into which they may not be trained. There is no spot of ground so small but what there is room for one or more specimens, and there is no perfection in the whole range of fruit growing that cannot be best reached by their aid. If it is size and color and perfection of form they sought, then must we turn to the dwarf trees to produce it. Even in the matter of quality, as tested by the palate, the dwarf trees at least hold their own, and in many cases surpass standard trees of the same variety.

For artistic effect, nothing can yield a greater variety than dwarf trees. We may imitate the standard and grow a miniature tree, perfect in every detail but only three or four feet high, yet loaded with highly colored and highly flavored fruit. Or, if we wish to grow a bush-like shrub, again we can train our dwarf stock to exactly meet the requirement. We can cover walls of the outbuildings with cordons of all descriptions, loaded with apples or pears, peaches, nectarines, plums, or whatever we wish. Or we can use the partition fences for supports and grow tree fruits as readily upon this trellis as we grow grapes in ordinary field culture.

The temptation is very strong to dwell upon the pleasures of pruning and training dwarf trees on walls and espaliers. Here again we would have to go to the European gardener for our best examples. It would not be enough, however, for us to simply use these examples which after all could only stimulate us. It would be necessary for us to go deeper into the matter and learn something essential of tree life that would enable us to prune and train these miniature trees into forms which suited our demands.

It will thus be seen it is not merely satisfying the eye and the palate. There is an intellectual pleasure in the development of our knowledge of tree life that forms more than a compensation for any trouble it may cause us. Of course we expect every man to own his land if possible; but even to the renter these dwarf trees offer an opportunity. They come into bearing so young, that a five years' lease will give the renter a chance to develop their tastes and reap the rewards in the case of these small trees.

I refrain, however, from going into details in this matter. It is only incidental in my subject of growing fruit in the city back yard. But I may at least say that there are so many varieties of apples, pears, plums and peaches that can be grown as dwarfs that there is ample choice for everyone. It is very true, however, that in the greater portion of the Province of Ontario the winters are too severe for many varieties quite successful as dwarfs. But there still remains a large territory where it would form a most interesting and profitable pastime.

The growing of dwarf trees in a city back yard might, I think, form the subject of many papers in your local associations. What dwarfing stock shall we use? What forms give the best results? How shall we develop fruit-spurs early in the life of the tree, and how shall we develop them where they are wanted?

The advantages and effects of pruning at different seasons of the year, the whole question of fertilizing and protecting both tree and fruit is so interesting that I am sure that once your members take up this work, they will not rest satisfied till their grounds are fully occupied.

Small fruits of course will be grown. They can be placed here and there, and with the skilful attention and rich soil in which they can be grown will yield most abundantly. The only one which I would reject—and here I speak subject to correction—would be the blackberry. This luscious fruit does not appear to be amenable to the restraints of the city backyard. It appears to have an almost supernatural faculty for reaching out, with its prickly branches and meeting every friendly advance with a vicious scratch. It must be relegated to the larger space of the commercial plantation.

Currants and gooseberries will furnish a most interesting line of work. The first will fruit abundantly wherever they can get rich soil, light and air. The gooseberry seems to flourish best in the partial shade, under the branches of trees, provided always that you can furnish the roots with a sufficient amount of moisture; indeed one of the essentials of its growth to perfection is moisture, both for roots and top, which can best be obtained in the partial shade of other plants. I put in a special plea for the gooseberry, inasmuch as better varieties, owing to the prevalence of gooseberry mildew, cannot be grown in commercial plantations, yet they not unfrequently succeed much better in conditions furnished by the small city lot, and it is quite possible that you may enjoy the luxury of this fruit denied to those who depend upon the commercial growers.

The strawberry is another plant that will well repay the greatest care. The average city man knows nothing of the real taste of the strawberry. He is obliged to take what he finds upon the market or go without. The commercial grower on the other hand would find it impossible to place a well ripened strawberry of the better varieties upon the market in its best condition. His only resource is to grow the coarser varieties and pick them on the green side, otherwise they would be a mass of shapeless pulp before they arrived at their destination. The city grower, however, can choose varieties famed, if not, perhaps, for the enormous quantity per acre, at least for the delicacy of their flavor, and he can leave the fruit upon the vine until it has absorbed that degree of richness which will make it a treat for the epicure. All I fear is this, that if the growing of strawberries were to become common, and if the city people found out how much better a well ripened strawberry is than the commercial article, the comercial growers would stand little chance of selling their product, except among the unfortunate class who could not grow them for themselves. And just here, I do not blame the commercial fruitgrowers; they are doing the best that can be done. It is a condition that cannot be overcome. Strawberries will of course, be grown upon the hill system, and there are many niceties in the growing of these which, if time permitted, I would be delighted to note.

What is true of strawberries, is true, perhaps, to a less extent, of raspberries. The smallest yard has a place for a few hills of these. Here may I digress to say, that we have in the raspberry an example of what amateur horticulture can do for the commercial grower. For many years the Cuthbert raspberry has held its place as the best commercial raspberry on the list. It was prolific and of fair quality, but slightly tender, so that quite frequently there were heavy losses in regions exposed to severe winter weather· The reports from the experimental stations in Ontario, and Mr. Macoun's report from the Central Experimental Farm, seem to show clearly that this old standby, the Cuthbert, is now likely to be superseded by the Herbert, which is not only quite as prolific as the Cuthbert, but is much hardier, so as to materially reduce the losses from winter killing. The point which I wish to note particularly is that this raspberry originated with our Vice-president, R. B. Whyte, Ottawa,, an enthusiastic amateur indeed, particularly, perhaps, for his flower garden, but who has succeeded most admirably with raspberries, and is growing some scores of the finer varieties of English and American gooseberries that have proved failures with almost everyone else who has tried them here. May we not hope that, if we can induce city dwellers to take up fruit growing in their small lots, we will develop many men of this type who not only have the extreme pleasure of developing the taste for horticultural pursuits, but will, perhaps, achieve the higher reputation of having benefited, in a very material degree, the whole community by the developing of better varieties or better methods.

I would like to put in a word for the grape. There are few gardens so small as not to afford room for half a dozen grape vines, and if properly pruned and protected, the northern range of the grape vine is very wide indeed. Mr. Macoun of the Central Experimental Farm, finds it possible to place over a hundred well ripened varieties on the table. By the use of a few sashes and with the help of some protective mats during the ripening period, some splendid results can be obtained with grapes. They are frequently used as a covering for an arbor and as such are to be highly recommended. The fact that the vine bears fruit interferes in no way with its use as an arbor plant; indeed it lends a further interest to the vine. If the grounds are very crowded, the outer walls of the buildings can be used as trellis space, and the root of the vine may be 10, to 30 or even 50 feet away. If the ground is well supplied with plant food and water, the grape may be planted almost anywhere under a tree, in a corner very close to the back porch, or even next the street. In such situations the roots can be supplied with a fertilizer and the fruit may be placed upon trellises in any convenient place. I knew an enthusiastic backyard gardener who grew a very large quantity of grapes, using the roof of a lean-to kitchen upon which to place his trellises. Here they grew and flourished without injuring the roof in the least and in the full glow of the southern sun, an essential, I may say, if we are to get the highest flavor.

One word with reference to the soil. Quite frequently backyards have been built up with the clay from the house excavations made from the cellar. This, of course, would be the most unpromising soil if left in this condition. Specially discouraging is it, if on the top of this clay soil we find an accumulation of coal cinders, tin cans, the remnants of various barrels and boxes, and other debris too numerous to mention. The first thing, of course, is to clean out the tin cans, burn the barrels and boxes, and then proceed to trench the soil. Usually it will be found quite possible to dig through the layer of clay soil until the ordinary loam of the original soil is reached. This is thrown on top of the clay. In the case of the second trench, the top clay is thrown to the bottom of the first trench, and the original loam is thrown on the top of this. This process is continued throughout the whole of the ground.

Although I can heartily recommend this as healthful exercise to any city dweller, I fear there are some who have not had the incentive of the valuable products which can be grown on this trenched soil, and they may become discouraged before tangible results are reached. I would therefore advise that this part of the work be done by proxy. If the ground is too heavy, it is usually not expensive to get a few loads of sand that may be dug into the soil to lighten it up. Of course, barnyard manure, more or less rotted, will be added to this and the whole will be thoroughly mixed by continuous working.

Another point that should not be disregarded is the drainage. By all means, lay, at least, one tile at a depth of about three feet connected with the city drains in some way. One of the frequent causes of failure in a city lot is the want of good drainage.

I have briefly outlined some of the essentials in growing fruit in a backyard. I would not have you understand that it is with me a pure matter of theory. Not only have I grown a lot of fruit in a very small yard myself, but I have seen many of my neighbors do the same thing, and am more and more convinced that there are few city dwellers who might not be enjoying the luxury of fresh fruit, and the still greater pleasure of an intelligent object of interest to occupy the hours that should be given to open air exercise. It is infinitely ahead of bowling on the green, and cricket and lacrosse cannot compare with it. Though it is not necessary to give up these altogether for the pleasures of the garden, I would, nevertheless, emphasize that once having undertaken the garden, its claims are exacting, and nowhere is negligence more promptly punished.

The PRESIDENT: We are most fortunate this afternoon in having associated with this very interesting subject two specialists, in the persons of Mr. McNeil and our Vice-President, Mr. Whyte, both of whom are recognized as accomplished orators—one of whom, we have heard, produced the famous Herbert raspberry, which is being advertised. I would much prefer myself getting it from Mr. Whyte to getting it from any of the nurseries.

Mr. WHYTE: Considering the interest of the paper that is coming after the discussion, it would be better to bring this to a close. It is getting late, and I think it would be better to take this subject up next year. I would like to say, however, this is one of the most important works that the Horticultural Societies can take up—that is, the disseminating of proper information on fruit growing for personal use. It is astonishing how much can be grown in a small garden if you utilize your space and make the most of it. I do not know that most people would think my garden small, but it is a city garden; and, as an illustration, we had twelve barrels of apples from it. The last thing I did was to put out thirty-six new seedling gooseberries. I have now about sixty. On the question of novelties, I move that a nominating committee be appointed to discuss this subject, to consist of Mr. Macoun, Prof. Hutt and Miss Blacklock of Toronto.

This was seconded by Mr. Scott and carried.

WILD FLOWERS WORTH GROWING.

BY JOHN DICKSON, HAMILTON.

Surely the student of nature possesses mines of treasure in the flowers of our fields and woods.

Their silent language, the eloquence of which is unsurpassed in the realm of articulated speech, interprets itself to us touching what in us is best and noblest, and vibrating those chords which are fullest of music and song.

The neglected children of the wild wood have stood side by side with the pampered offspring of the garden, and have received equal notice with them in the songs of many poets in various times; and all who sing of them declare they have locked within their bosoms weighty lessons for the thought and investigation of man.

"Their voiceless lips" says one, "are living preachers, each cup a pulpit and each leaf a book." We enter fully into the keen appreciation which Wordsworth displayed for these "tender nurslings of the vernal skies," when he sang:

> "To me the meanest flower that blows can give
> Thoughts that do often lie too deep for tears."

The gardener who would make a success of the culture of wild flowers should visit them in their native homes; study their habits, and provide for them in their new abode an environment adequately suited to their individual tastes and requirements; for, as Virgil observes, "Not every plant on every soil will grow."

I purpose to take up what I consider some of the best wildlings for garden culture, in order, according to their period of flowering.

The Anemones or *Hepatica Triloba* and *acutiloba* are our earliest blooming spring flowers. Undoubtedly these are the handsomest of all wild flowers. "Lowly yet loveliest of the sylvan troop that court fair April's dewy kiss," springing into life while yet the earth is wearing the faded and cast off mantle of a previous summer's glory, they unfold their fuzzy robes and lift their modest faces to the sun. The flowers, about three-quarters of an inch in diameter are produced before the new leaves, on scapes or stems four to six inches tall. Their colors range from white, through pink, mauve to blue, the sepals varying in number from five to twelve or even twenty surrounding a pale green white lashed eye. They are very easily cultivated, readily adapting themselves to almost any position, but preferring a shaded situation. Still they love the light and close their eyes when the sun goes down. Thickly set they make very handsome borders, the foliage being quite attractive after the season of bloom has passed. Double forms have often been found.

Anemone Pennsylvania and *Anemone Virginiana* are taller growing and later flowering plants.

Sanguinaria Canadensis, American Bloodroot, so-called from the color of the juice, receives a very popular welcome among the floral visitors of spring. Its exquisite beauty is best seen in its native haunts or after becoming established in the home of cultivation. The flowers, each produced with the unfolding and protecting leaf, are borne singly upon a scape about six inches tall. They are about one and one-half inches in diameter, and consist of from eight to twelve oblong petals, waxy in substance, and much resembling the orange blossom. Owing to their fugacious character they are of little value for bouquets but the large pale green, lobed leaves and glistening white blossoms form quite an attractive feature of the garden.

The Trilliums, commonly called Wake Robins, closely follow the foregoing, responding to the touch of "the stooping showers that sandal the feet of May with flowers." In our locality we have four species, *Trillium Grandiflorum,* and *Cornutum,* white, erectum, purple; and *Erythrocarpum* or Painted Trillium, white with red stripes. *Grandiflorum* is the best of the genus for garden culture. It is a tuberous rooted perennial herb which in early spring elbows a stout stalk up through the soil into the light and air where it expands a verticel of three deep green sessile leaves and a large white terminal flower which turns pink as it ages. The size varies under different conditions, the stem being seven to nineteen inches high, the ovoid leaves two to four inches wide, and two to six inches long. The petals are usually about two inches long and one inch wide. Clumps of these plants make a fine show and will succeed in almost any garden soil. The species is highly prized in Britain where the bulbs command a higher price than the, to us, rare daffodils.

Viewing a hillside of trilliums in bloom one is reminded of a household of happy children, glad to be relieved of the trammels of winter, waving their white bonnets in a joyous farewell to that deposed monarch as his pinions rise and fall in the distance.

Uvularia grandiflora, Bellwort, is a native of very attractive appearance, growing from one to two feet high and bearing numerous pale yellow, nodding bell shaped flowers.

The Violet is one of the oldest flowers in cultivation. Its history extends back into antiquity. Mythology tells us of the gods and goddesses of Olympus and how Ianthe, the beloved of Phœbus, was changed into a violet, so that she could modestly bloom in March without the sun god knowing her whereabouts, but this was in a different climate. She must have been quite prolific, as there are over five hundred recognized species in the world. Several species are found in our locality, the flowers being pretty but lacking perfume, with the exception of *Viola blanda,* a small, modest white blossomed marsh form. *Viola Dicksoni*, a common blue form, is easily cultivated and quite showy in its season. *Viola Canadensis*, a taller growing white form, also succeeds very well and produces flowers throughout the summer. The two latter species are not very particular as to soil or location, but *Viola Pedata*, Bird's Foot violet, with its variety bicolor, the gem of the family, requires sandy soil and sunshine. The very pretty *Viola Ovata* also requires light soil.

Phlox divaricata, the common Phlox of our Canadian woods, has sweetly fragrant pale blue, lilac or white flowers, borne on diffuse or ascending leafy stems and is among the most showy bloomers of its season. They form beautiful compact tufts under cultivation.

Dicentra cucullaria, Dutchman's Breeches, and *Dicentra Canadensis*, are cousins of our old garden friend, the Asiatic species, *Dicentra spectabilis*, or Bleeding Heart. These plants are very similar, both having compound dissected foliage, and scapes bearing racemes of white heart-shaped flowers. Naturally they are found growing side by side in rich woods; *Cucullaria* with yellow-tipped and *Canadensis* with pink tinged blossoms possessing the fragrance of the hyacinth. In botanical nomenclature the name *Bicuculla* has now supplanted that of *Dicentra*, but I use here the more familiar titles.

Closely allied to these plants is that graceful native climber, the Allegheny Vine, *Adlumia fungosa*.

Mertensia Virginica, Virginian Cowslip, or Blue Bells, commands attention wherever seen. It grows from one to two feet high, has smooth leaves, and bears nodding terminal clusters of twenty or more showy blue purple flowers. Although it grows naturally in low meadows or on banks of streams, it is easily cultivated in good garden soil, attaining its best about May 24th, and dying down to the ground soon after blooming as also does its companion, the beautiful White Dog's tooth violet, *Erythronium Albidum*.

Tiarella cordifolia, well named the Foam Flower, is alike beautiful in foliage and blossom, having large orbicular brown-spotted green leaves and exquisite creamy-white star-shaped flowers in tall racemes. It is worthy of a place in every garden.

Thalictrum dioicum, Early Meadow-rue, grows to the height of from one to two feet. The flowers are small purplish or green, waving in masses above the delicate graceful foliage. This plant is highly ornamental either for bouquets or growing in the rockery. It prefers shade.

Aquilegia Canadensis, Wild Columbine. Wherever seen growing the *Aquilegia* is recognized as a queen among wild-flowers. It is a robust plant with ternately de-compound leaves, and a profusion of scarlet and yellow nodding flowers, two inches long with nectar bearing spurs, terminates its branches. This plant always suggests to my mind the likeness to some master-piece of architecture, a verdure-clad cathedral, as it were, set about with bells, the music of whose chimes, inaudible to man, but heard perchance by other ears than ours, swells out on every breeze that stirs its towers, calling the busy honey-gatherers to enter its portals. Howard Gilbert had perhaps a similar thought when he said:

> "There from the rock-cleft rude
> Up springs with nodding bells, the Columbine,
> And round her ever, in her solitude,
> The wild bees' winglets shine."

Cerastium arvense, (*Var. Villosum*) or Hairy Field Chickweed, has tufted white starry flowers in terminal cymes, borne above the hoary, densely villous foliage. It is pretty and showy and would make a fine companion for *phlox sabulata* or moss pink.

Galium boreta or Northern Bedstraw, grows in masses one to two feet high, has delicate sprays of panicled fragrant white flowers; is easily grown and forms attractive clumps. Specimens sell for fifty cents apiece in California.

Euphorbia corollata, Flowering Spurge, is a very pretty native with small flowers, surrounded by large white petal-like appendages of very showy appearance.

Cypripedium spectabile, Showy Lady's Slipper, is said by Asa Gray to be the most beautiful of terrestrial orchids. The plant attains a height of about two feet. The flowers are composed of narrow spreading sepal and petals with a large inflated white or pink lip and are borne upon a leafy stem. It requires leaf mould and peat, and does nicely in a rockery.

Cypripedium pubescens, Larger Yellow Lady's Slipper, and *Cypripedium Parviflorum*, Smaller Lady's Slipper, differ from the preceding in having yellow flowers and are not so fastidious as to soil and surroundings, being found in marshy ground, leaf mould or stiff clay. *Cypripedium acanle* has beautiful rose purple flowers and fine foliage, but I have not succeeded in keeping it more than one season.

Asclepias tuberosa, Butterfly Weed, or Swallow Wort. In this plant we have one of our most showy and striking native flowers, although, perhaps, it would be incorrect to apply the term beautiful, as a close inspection betrays the irregularity of growth, and rough unattractive foliage. But here distance lends enchantment. Its large masses of orange-red flowers are easily discerned for half a mile on a bright day.

Asclepias tuberosa was one of the earliest of our native flowers to invite culture in British gardens, being cultivated at Hampton Court, England, in 1690.

It flowers from June to September and having a large tap-root requires well drained and easily penetrated soil. Aside from its worth as an ornamental plant, the structure of its flowers is extremely interesting. Like some other plants it has a peculiar motion in expanding its bloom. As the flower-buds mature the sepals unfold rapidly, in a short time changing their position from erect to recurved. This peculiarity of motion is also noted in *Oenothera, Biennis,* Evening Primrose, of which variety grandiflora claims our notice. The very large, clear sulphur yellow fragrant flowers measure four to six inches in diameter. This is a night bloomer, the buds kicking themselves open just after sunset. The plants grow to a height of six feet, branching profusely, and bearing throughout the entire summer countless numbers of blossoms which form a great attraction for the Sphinx moth. These long tongued creatures flutter like humming birds among the flowers as they collect the nectar and incidentally distribute the pollen.

We now come to that king of wild flowers, *Lilium Superbum,* Turk's Cap Lily. In our locality it attains a height of from six to eight feet, bearing in a pyramidal raceme three to forty flame colored, long-pedicelled flowers. The writer has seen, literally, groves of these magnificent plants lifting their flaming candelabra high above his head.

Lilium Philadelphicum, or Wood Lily, is a beautiful little plant of strict habit, bearing one terminal yellow red flower. The petals of this lily are raised on claws and do not reflex. These are fragile little plants in comparison with the *Superbum,* nevertheless it thrills the beholder with admiration to note with what exquisite grace they poise their chalices of gold.

Monarda didyma, Wild Bergamot, or Bee-balm, now rare in our locality, is an old favorite of our grandmother's gardens. The flowers are brilliant scarlet, borne in terminal heads, foliage is sweet scented.

Lobelia Cardinalis, or Cardinal Flower, grows by the brookside, being a lover of damp black loam. It reaches a height of from two to four feet, producing an elongated raceme of very showy velvety crimson flowers. These trim erect plants, whose flowers glow like living coals, when seen upon their natural background of dark green, certainly remind one of "red coated sentries in a wood."

Although there are few more beautiful fall blooming flowers than the Wild Asters, about seventy-five distinct species of which grow in Northeastern America, they are seldom seen under cultivation. Many of them would well repay the necessary care expended and a more floriferous or showy object than a good-sized clump of *Aster Novæ-Angliæ,* or New England Aster, with its violet, purple to pink or red flowers, could scarcely be desired.

To this list there are still many plants which might be added had we time to write of them as well as time to cultivate them; many truly worthy shrubs and vines which would prove satisfactory in any garden, and I feel that there is not one, even the lowliest of all the troop that sweeps across the seasons but is worthy of our best thought and study. All who will may find:

"A lesson in each flower,
A story in each tree and bower,
On every herb on which we tread
Are written words, which, rightly read,
Will lead us from earth's fragrant sod
To hope and holiness and God."

In talking about the business for next year, there is one subject I would like to see discussed by someone who has had experience, and that is, the growing of Clematis. There are a great number grown in Canada, but they nearly all die.

DISCUSSION.

PRINCIPAL SCOTT: When your secretary asked me to lead the discussion on this subject I had no hesitation in saying "Yes," because I like wild flowers. I like to hear about wild flowers, and I owe very much to them.

We are told in mythology that Antæus and Hercules had a fight. Hercules would knock Antæus down, but every time that Antæus came in contact with his mother earth he rose invigorated, stronger than ever before. So Hercules came to the conclusion that if he were to win the fight he must change his tactics. Accordingly, he raised Antæus from the earth and strangled him in mid-air. I maintain that persons in sedentary pursuits very often strangle themselves by failing to come in contact with mother earth; and I owe very much to her and her bountiful children.

I will simply speak to you for a minute or two about the plants which I have brought into my little plot up on Church Street, Toronto, and in which I take a great deal of pleasure seeing them unfold each spring. I will not speak of the many plants that are out in the woods.

To begin with, there is the Blood Root. This does not last very long, but its foliage grows and expands and is beautiful all the summer. I came across a plant, *Jefferson Dipylla*, for the first time two or three years ago, up the Humber. I brought home a little root of that, and it bloomed for the first time this spring. It was a delight to everybody. They would come in and say: "What a beautiful plant that is. It is as white as the driven snow." And then afterwards, when the leaves began to come up and expand on their tall stems people would say: "Where did you get that plant?" "Had you trouble in growing it?"

Then the Hepaticas. I grew both kinds in clumps, the *Triloba* and *Acutiloba*. They come up in rather big clumps which you could cover with your hat, and are a beautiful source of pleasure to all of us. Mrs. Scott brings in little bouquets of them long before we can get any other flowers, except from the green-house.

Then the Trilliums. I can bear testimony to what Mr. Dickson said about them, both the *Grandiflorum* and *Erectum*. Two or three years ago I happened to be over at Niagara-on-the-Lake, and, going out into the woods one day, I came across one of the most beautiful sights that ever fell to my lot to see. Of course, I put a few into my pocket and planted them when I got home. They are doing splendidly.

Then come the Lady Slippers. The *Cypripedium* does well. I cultivated it, and it comes up year after year.

The *Thalictum Dioicum*. I have never grown the Dioicum, but I have the *Cornuti*, not for its flowers, but for its foliage. Last year it was a plant in my garden taller than I am, with several spreading branches, such as those the birds like to come and lodge in. It certainly is a fine plant, and it is one that is taken out of its usual habitat, which is a damp place.

Then the Ranunculus. At one time I was asked to go up to Seaforth: and, walking along the street, I came across a strange Ranunculus, and I got down on my hands and knees and took up a root and brought it home and planted it, and it has been doing so well that I am getting into trouble. It it spreading so. I have sent down various specimens to Ottawa, and I am told it is *Ranunculus Repens*. It has a profusion of fine foliage and a model leaf.

Then the *Smilacina Stellata* does splendidly in my garden. It grows and spreads so well that I will soon have to put an end to its spreading.

The *Lilium Philadelphicum* comes up year after year and does well.

We have the *Asclepias Cornuti*, which has leaves like the rubber plant *and the Asclepias Tuberosa.* It is a pleasure to go out and watch these things trying to get up through the ground.

We have the Gentians, *Crinita* and *Andrewsii.* The only Aster I tried to grow is the *Aster Multiflorus.* It is worth growing here in the sandy soil, and it is certainly a delight. I quite agree with Mr. Dickson, that it is a most beautiful one. One advantage with the *Multiflorus* is that it takes up a very small space in the garden.

I need not speak of the Sunflower. I bought one called the *Helianthus Giganteus*, and it overtops the fence. It is a delight not only to ourselves, but to our neighbors. Then there is the *Rudbeckia Hirta*, which is very beautiful when transplanted. It is in some parts counted a weed, but when you bring it into the garden it is certainly a delightful plant. It blooms in the centre of a bed, and it will repay you for any trouble you may give to it.

I will read to you a quotation from Emerson which appeals to me. It has reference to the wild plants that are brought into the garden; and then, on the contrary, going out to see them in their native home. It expresses my ideals:

"I thought the sparrow's note from Heaven
Singing at dawn on elder bough.
I brought him home in his nest at even —
He sings the song, but it cheers not now,
For I did not bring home the river or sky.
He sang to my ear; they sang to my eye.

"The delicate shells lay on the shore;
The bubbles of the latest wave
Fresh pearls to these enamel gave;
And the bellowing of the savage sea
Greeted their safe escape to me.
I wiped away the weeds and the foam,
I fetched my sea-born treasures home;
But the poor, unsightly, noisome things
Had left their beauty on the shore
With the sun and the sand and the wild uproar."

The PRESIDENT: The programme of this convention could scarcely close with a more entrancing address than we have just listened to from Principal Scott. His "talk" has been most charming to me, and I am sure it was to you all.

Mr. SCOTT: Yesterday this Society appointed a committee and charged it with a certain duty. The committee was appointed as the outcome of one of the papers delivered here in the afternoon of the first day of our meeting. That committee, of which I am chairman, reports that it considered, in so far as it was able to consider, the matter which you placed in our hands. But it is very large, and we desire to see people who are not accessible to us. If we were to manifest anything like fidelity to the work that we came here specially appointed with, we have to report that work unfinished. I think a resolution should be brought before us dealing with that committee and the work that is to be continued.

Moved by Mr. BISHOP, seconded by Mr. CAVERS, that the committee, which has just reported, be continued in office, to present, during the year, the work referred to in the report just adopted, by further memorial to the Government, or by interview with the Hon. the Minister of Education and his Deputy, in order to secure the introduction into the proposed new series of Readers of the Horticultural features desired by this Association."

PRESIDENT: I would like to ask you all, when you return to your homes, to report to your Societies at an early date the success of this meeting. I am sure we have all been gratified with the fine spirit and the "swing" with which our two days' Convention has gone right from the opening hour.

I would also like you to convey to your societies Prof. Hutt's very generous offer to furnish vegetable seeds to all our school children who desire to go into school gardening or private gardening on their own account.

We might take into account some idea of the grand work the Guelph College and the Experimental Union are doing for this Province. We have been honored with the presence of our new Superintendent. He has been most assiduous with his presence, and I would like to ask Mr. J. Lockie Wilson to say a few words in conclusion.

MR. LOCKIE WILSON: I can assure you that it has been a great pleasure to me to have attended all your sessions, and to have taken part, in a humble way, in some of the discussions. I shall always be glad to hear from the members of the societies, and will endeavor in every way to further the great interests of the work they have in hand. We will endeavor this incoming year to send out lecturers to societies who would like to have them. Last year we sent out about twelve or fifteen speakers to those who asked for them, and I hope to be able to send at least one lecturer to each society during the coming year. At this late hour I do not wish to take up any more of your time. I would just quote, in conclusion, the words:

"The gardener's work is one of worth,
He's partner with the sky and earth;
He's partner with the sun and rain,
And no man loses by his gain."

The Second Annual Convention of the Ontario Horticultural Association brought its most successful meeting to a close by singing the National Anthem.

HORTICULTURAL SOCIETIES, 1907.

Name.	Expenditure in 1906.	Membership,		Legislative Grants,	
		1906.	1907.	1906.	1907.
	$ c.			$ c.	$ c.
Barrie	109 25	65	67	70 00	60 00
Belleville	276 34	116	94	140 00	133 00
Bowmanville	220 24	91	102	81 00	105 00
Brampton	273 87	119	155	112 00	133 00
Brantford	278 61	53	75	140 00	110 00
Cardinal	218 85	68	77	140 00	96 00
Cayuga	174 30	102	73	72 00	95 00
Clifford	261 25	143	102	73 00	138 00
Clinton	244 75	105	119	100 00	119 00
Cobourg	218 23	82	89	140 00	101 00
Collingwood	227 00	140	124	87 00	126 00
Dunnville	143 08	100	100	112 00	84 00
Durham	155 97	57	54	49 00	72 00
Elmira	109 91	55	68	59 00	56 00
Elora	117 95	55	43	38 00	59 00
Fergus	144 75	63	68	43 00	70 00
Galt	288 95	104	160	114 00	133 00
Goderich	146 00	41	66	85 00	63 00
Grimsby	72 06	61	52	42 00	46 00
Guelph	289 97	93	95	105 00	129 00
Hamilton	454 03	171	171	350 00	365 00
Hespeler	216 82	80	66	67 00	100 00
Kincardine	223 72	135	114	62 00	123 00
Kingston	371 00	184	264	140 00	189 00
Lindsay	153 30	82	104	84 00	81 00
London	402 21	168	241	140 00	388 00
Midland	148 48	75	85	51 00	76 00
Millbrook	137 50	53	59	55 00	64 00
Mitchell	172 47	110	112	105 00	97 00
Napanee	241 94	57	74	140 00	100 00
Newmarket	247 95	67	44	71 00	105 00
Niagara Falls	114 03	58	—	42 00	59 00
Oakville	160 43	70	86	70 00	78 00
Orangeville	187 62	102	72	127 00	99 00
Orillia	196 25	76	76	57 00	92 00
Ottawa	773 02	273	377	350 00	690 00
Owen Sound	234 64	90	90	49 00	110 00
Paisley	201 75	116	136	47 00	109 00
Perth	327 81	127	128	111 00	154 00
Peterboro	218 97	166	147	140 00	133 00
Picton	145 50	97	98	112 00	84 00
Port Dover	189 96	60	41	52 00	84 00
Port Elgin	91 55	55	52	31 00	51 00
Port Hope	177 21	97	75	94 00	94 00
Preston	323 55	99	99	113 00	142 00
St. Catharines	942 34	287	426	77 00	412 00
St. Thomas	138 55	84	77	37 00	76 00
Seaforth	343 81	142	136	72 00	165 00
Simcoe	202 17	75	66	63 00	93 00
Smith's Falls	288 46	140	111	118 00	146 00
Springfield	161 79	126	50	62 00	100 00
Stirling	159 61	52	51	104 00	71 00
Stratford	326 21	161	137	84 00	166 00
Strathroy	224 00	140	110	84 00	125 00
Thornbury	75 21	56	68	30 00	45 00
Tillsonburg	104 00	65	60	39 00	58 00
Toronto	492 71	118	168	140 00	317 00
Vankleek Hill	87 06	57	52	78 00	50 00
Walkerton	162 09	60	63	76 00	75 00
Waterloo	312 25	152	144	120 00	158 00
Windsor	547 52	179	223	105 00	244 00
Woodstock	213 06	92	93	65 00	104 00
	14,863 88	6,367	6,629	5,816 00	8,000 00

STATEMENT OF ACTUAL RECEIPTS AND EXPENDITURE OF SOCIETIES IN 1907.

Horticultural Societies.	Members' fees.	Legislative grant.	Municipal grants and donations.	Gate receipts at exhibitions.	Total actual receipts.	For exhibitions.	For seeds, bulbs and plants.	Lectures and periodicals.	Officers' salaries.	Total actual expenditure.
	$	$	$	$	$	$	$	$	$	$
Barrie	67	60	30	27	215	85	30	......	......	147
Belleville	94	133	......	......	238	......	193	22	25	276
Bowmanville	102	105	......	......	234	......	203	38	4	264
Brampton	155	133	......	......	288	......	285	78	12	381
Brantford	75	110	100	......	285	51	73	5	35	273
Cardinal	77	96	......	......	181	......	138	39	......	206
Cayuga	73	95	......	......	168	......	96	......	......	105
Clifford	102	138	51	160	571	258	......	......	16	424
Clinton	119	119	......	38	276	41	225	......	10	299
Cobourg	89	101	......	......	190	10	108	46	......	197
Collingwood	124	126	94	......	344	268	......	38	......	306
Durham	54	72	......	......	158	......	82	4	32	173
Elmira	68	56	......	......	141	33	71	33	10	161
Elora	43	59	......	......	102	72	......	......	......	98
Fergus	68	70	......	18	156	83	......	......	10	118
Galt	160	133	86	27	419	139	44	17	35	301
Goderich	66	63	20	.....	149	.....	30	21	......	63
Grimsby	52	46	......	......	98	......	53	34	......	89
Guelph	95	129	100	......	327	171	......	......	......	281
Hamilton	171	365	......	......	536	......	274	171	46	511
Hespeler	66	100	......	......	188	7	96	26	7	150
Kincardine	114	123	......	......	245	......	112	58	25	261
Kingston	264	189	......	61	543	244	......	......	50	476
Lindsay	104	81	......	......	189	7	75	54	20	173
London	241	388	......	23	689	29	85	158	30	437
Midland	85	76	......	......	161	......	49	41	......	98
Millbrook	59	64	21	......	150	......	91	30	......	135
Mitchell	112	97	5	......	218	10	145	55	20	274
Napanee	74	100	......	......	180	......	64	36	25	165
Newmarket	44	105	25	21	217	109	......	......	25	217
Oakville	86	78	......	......	182	......	39	89	15	174
Orangeville	72	99	11	......	182	......	65	40	45	181
Ottawa	377	690	92	......	1,160	383	265	139	100	1,094
Owen Sound	90	110	81	12	295	103	30	68	30	287
Paisley	136	109	.....	27	272	184	......	......	10	213
Perth	128	154	30	......	312	.....	176	76	......	287
Peterborough	147	133	......	......	290	......	145	66	25	267
Picton	98	84	......	......	282	......	135	8	20	184
Port Dover	41	84	45	......	236	52	39	31	15	173
Port Elgin	52	51	......	......	105	110	......	......	......	112
Port Hope	75	94	......	......	169	......	104	39	......	148
St. Catharines	426	412	979	380	2,784	1,233	353	131	130	2,740
St. Thomas	77	76	9	......	162	52	32	38	12	153
Seaforth	136	165	20	12	375	13	208	56	......	307
Simcoe	66	93	......	18	199	.....	52	33	35	156
Smith's Falls	111	146	......	......	157	19	114	56	......	230
Springfield	50	100	......	......	262	......	15	9	10	205
Stirling	51	71	......	......	122	......	81	22	......	107
Stratford	137	166	27	26	378	160	38	52	35	423
Strathroy	110	125	......	......	236	54	......	10	25	133
Thornbury	68	45	4	......	117	......	52	35	10	103
Tillsonburg	60	58	25	41	213	73	63	26	25	236
Toronto	168	317	100	......	731	......	285	147	......	747
Vankleek Hill	52	50	......	44	313	75	180	13	......	336
Walkerton	63	75	......	......	148	......	39	13	22	96
Waterloo	144	158	......	......	338	......	207	72	35	345
Windsor and Sandwich	223	244	350	......	817	......	216	273	......	643
Woodstock	93	104	......	28	246	44	94	47	......	214
Totals	6,354	7,623	2,305	963	18,939	4,172	5,649	2,593	1,036	17,353

N.B.—Financial Reports of Dunnville, Orillia and Preston Societies were not received at time of going to press. Niagara Falls Society no longer exists.

PRESIDENTS AND SECRETARIES OF HORTICULTURAL SOCIETIES.

Society.	President.	Secretary.	Secretary's Address
Amherstburg	Oscar Teeter, M.D	Rev. Thos. Nattress	Amherstburg.
Barrie	J. H. Bennett	H. B. Myers	Barrie.
Belleville	H. J. Clarke	W. Jeffers Diamond	Belleville.
Bowmanville	Rich. Jarvis	A. Barber	Bowmanville.
Brampton	Thos. Thauburn	J. E. Cooper	Brampton.
Brantford	J. T. Rose	R. Walter Brooks	Brantford.
Cardinal	J. Bradley	E. E. Gilbert	Cardinal.
Cayuga	And. Williamson	Thos. E. Lishman	Cayuga.
Clifford	D. Campbell	Jno. R. Scott	Clifford.
Clinton	W. D. McTaggart	Jas. Fair	Clinton.
Cobourg	J. D. Hayden	Major H. J. Snelgrove	Cobourg.
Collingwood	W. A. Hogg	Jas. Guilfoyle	Collingwood.
Dunnville		L. H. Weaver	Dunnville.
Durham	A. W. H. Lauder	Chris. Firth	Durham.
Elmira	Geo. Klinck	C. W. Schierholtz	Elmira.
Elora	Wm. Findlay	Jos. W. Love	Elora.
Fergus	A. A. Armstrong	J. C. Templin	Fergus.
Galt	Andrew Newlands	A. G. Elmslie	Galt.
Goderich	Jas. Mitchell	W. Lane	Goderich.
Grimsby	Dr. J. R. Smith	C. W. Van Duzer	Grimsby.
Guelph	T. J. Moore	Miss Annie Rose	Guelph.
Hamilton	Jno. Cape	Jos. Kneeshaw	Hamilton.
Hespeler	G. W. Tebbs	J. N. Cober	Hespeler.
Kincardine	J. C. Cooke	Jos. Barker	Kincardine.
Kingston	Lt.-Col. R. E. Kent	A. W. McLean	Kingston.
Lindsay	Robt. Chambers	F. J. Frampton	Lindsay.
London	E. L. Liddicoatt	C. P. Butler	London.
Midland	Robt. Irwin	Robt. G. Nesbitt	Midland.
Millbrook	A. T. Armstrong	W. S. Given	Millbrook.
Mitchell	C. H. Eisler	Albert J. Blowes	Mitchell.
Napanee	W. S. Herrington	Miss J. E. Ham	Napanee.
Newmarket	J. H. Davey	Wm. Keith	Newmarket.
Oakville	E. A. Morden	Jno. Cavers	Oakville.
Orangeville	Geo. Nicholson	Andrew Hill	Orangeville.
Orillia		Jas. A. Fowlie	Orillia.
Ottawa	Edward Mepsted	J. F. Watson	62 Park Av., Ottawa
Owen Sound	W. T. Lee	J. Y. Jackman	Owen Sound.
Paisley	R. Dewar	F. E. Sheppard	Paisley.
Perth	Chas. Meighen	C. J. Foy	Perth.
Peterborough	H. C. Rogers	H. L. Beal	Peterborough.
Picton	W. J. Carter	Walter T. Ross	Picton.
Port Dover	Jas. Symington	F. J. Taylor	Port Dover.
Port Elgin	Jno. J. George	W. A. Mitchell	Port Elgin.
Port Hope	A. G. Aldrich, M.D	G. A. Outram	Port Hope.
Preston		Geo. Kammacher	Preston.
St. Catharines	W. B. Burgoyne	Miss L. A. Radcliffe	St. Catharines.
St. Thomas	J. M. McCutcheon	W. J. Shaw	St. Thomas.
Sault Ste. Marie		J. H. Hugill	Sault Ste. Marie.
Seaforth	Wm. D. Hoag	Andrew Scott	Seaforth.
Simcoe	H. H. Groff	J. Thos. Murphy	Simcoe.
Smith's Falls	Dr. McCallum	Wm. T. Ferguson	Smith's Falls.
Springfield	M. M. Black	Vernon Chute	Springfield.
Stirling	Mrs. Jas. Boldrick	G. G. Thrasher	Stirling.
Stratford	James O'Loane	T. H. Lennox	Stratford.
Strathroy	Thos. Benstead	R. F. Richardson	Strathroy.
Thornbury	H. Pedwell	Geo. Wright	Clarksburg.
Tillsonburg	V. A. Sinclair	W. W. Livingston	Tillsonburg.
Toronto	H. R. Frankland	Chas. E. Chambers	City Hall, Toronto.
Vankleek Hill	J. L. Browne	D. G. Mode	Vankleek Hill.
Walkerton	Jas. Tolton	T. E. Attwood	Walkerton.
Walkerville	C. J. Stodgell	C. D. Brown	Walkerville.
Waterloo	Robt. Y. Stuart	J. H. Winkler	Waterloo.
Windsor and Sandwich	S. Lusted	D. J. Cheyne	Windsor.
Woodstock	J. W. Armstrong	R. W. Vroman	Woodstock.

ANNUAL REPORT

OF THE

Bureau of Industries

FOR THE

Province of Ontario

1907

PART I.—AGRICULTURAL STATISTICS.

PART II.—CHATTEL MORTGAGES.

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.

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TORONTO:
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1908.

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TORONTO.

To the Honourable

WILLIAM MORTIMER CLARK, K.C.,

Lieutenant-Governor of the Province of Ontario.

May it Please Your Honour:

The undersigned begs to present herewith for the consideration of Your Honour the Report of The Ontario Bureau of Industries for 1907.

Respectfully submitted,

NELSON MONTEITH,

Minister of Agriculture.

Toronto, 1908.

CONTENTS.

PART I.—AGRICULTURAL STATISTICS.

PAGE.
THE WEATHER: General review showing the monthly *temperature, sunshine,* and *rainfall* for the ten years 1898-1907 7

VEGETATION: Spring Seeding 9

THE GRAIN CROPS: General description as to condition and harvest.
Fall wheat 10
Spring wheat 11
Barley 11
Oats 11
Rye 12
Peas 12
Beans 12
Buckwheat 12
Corn 12

HAY AND CLOVER: General description 13
Clover seed 13

FIELD ROOTS: General description.
Potatoes 13
Carrots 14
Mangels 14
Turnips 14
Sugar beets 14

FRUIT AND FRUIT TREES: General description 14

MISCELLANEOUS:
Flax 15
Lucerne 15
Rape 15
Tobacco 15
Weeds 15
Fall Plowing 15
Threshing and Marketing 15
Farm Improvements 16

LIVE STOCK AND THE DAIRY: General review as to condition.
Live Stock 16
Poultry 17
The Dairy 17
Cheese factories 17
Creameries 17

LIVE STOCK AND FODDER SUPPLIES 18

BEES AND HONEY 22

LABOR AND WAGES: General condition, with statistics of average wages of *farm laborers and domestic servants* for ten years 22

INSECTS AND PLANT DISEASES 23

STATISTICS OF THE WEATHER: Showing details by months and stations or districts.
Temperature, 1907 24
Temperature, 1882-1907 25
Rain or Snow 22, 26
Sunshine 27

PAGE.

Rural Area Assessed: Showing by counties as taken by municipal assessor for 1907. The total *area*, acres *cleared*, acres in *woodland*, acres in *slashland*, and acres in *swamp*, *marsh* or *waste lands*; also totals for the Province for the ten years 1896-1907 28

Statistics of Field Crops: Showing by counties the area, produce, and market values for the year 1907, together with totals for the Province for the past ten years, and the averages for the period 1882-1907; also the average yield per acre.
Fall wheat 29
Spring wheat 29
Barley 30
Oats 30
Peas 31
Beans 31
Rye 32
Buckwheat 32
Corn 33
Potatoes 34
Turnips 34
Other field roots 35
Hay and clover 35
All field crops as above 36
Orchard, small fruits and vineyard 36
Mixed grains 36

Ratios of Areas under each Crop in 1907 per 1,000 Acres of Cleared Land 37

Market Prices: Showing for the leading markets of Ontario the average prices of agricultural products for the last four months of 1907, with comparative market prices for the Province for the past ten years and the averages for the twenty-six years period 38

Statistics of Live Stock: Showing by counties the number and value of stock on hand July 1, 1907, together with the number and value of those sold or slaughtered during the year ending June 30, 1907; also comparative totals for the Province.
Horses 39
Cattle 39
Sheep 40
Swine 40
Poultry 40

Values of Farm Property: Showing by counties the value of *farm land*, *farm buildings*, *implements* and *live stock* 41
Farm property values per acre occupied 42
Value of buildings, implements and live stock per acre cleared 42

Cheese Factories: Showing by counties the number of cheese factories, the quantity of cheese made, number of patrons, etc. 43

Agricultural Statistics of the United States 44

Crops in Manitoba and North West Territories 45

PART II.—CHATTEL MORTGAGES.

Chattel Mortgages on Record: Showing by counties the number and amount of chattel mortgages on record and undischarged on December 31, 1907, against (1) all occupations, (2) farmers; also totals for the Province for ten years 47

Ontario Bureau of Industries.

PART I.—AGRICULTURAL STATISTICS.

THE WEATHER.

Under their respective headings, summary tables of temperature, precipitation, and sunshine are herewith presented:

TEMPERATURE. The following table gives the temperature of the Province in each month for the last ten years, together with the mean annual temperature; also the mean temperature for the six months April-September—practically the growing season—together with the averages for the twenty-five years, 1882—1907:

Month.	1907	1906	1905	1904	1903	1902	1901	1900	1899	1898	1882-1907
	°	°	°	°	°	°	°	°	°	°	°
January	16.9	26.6	13.6	10.8	18.5	18.7	19.0	21.9	18.7	20.2	17.3
February..........	13.1	18.4	12.7	8.8	21.8	18.1	13.0	17.1	15.2	22.0	17.0
March	31.0	23.4	27.2	26.2	37.4	35.0	26.9	20.5	25.8	35.6	26.6
April	36.4	43.3	41.1	37.5	43.3	43.6	45.0	44.8	44.5	42.1	41.4
May..............	47.3	53.5	52.7	56.1	56.8	53.2	54.6	54.6	55.7	55.5	53.5
June..............	63.2	65.0	62.8	63.3	60.8	59.2	65.8	64.1	64.8	65.6	63.9
July..............	67.3	68.2	68.7	66.2	67.3	68.6	71.9	68.2	67.5	70.2	67.9
August............	63.7	70.0	66.1	63.3	62.4	63.5	67.5	70.9	68.5	67.7	64.7
September	59.5	63.3	60.9	57.2	59.0	59.0	60.1	62.3	56.2	61.8	58.9
October...........	44.1	47.6	47.5	45.0	49.2	46.3	48.5	55.2	50.0	48.7	46.4
November.	34.3	45.0	33.7	33.6	32.3	41.0	31.9	35.3	38.0	34.9	34.9
December..........	26.5	19.9	27.0	17.6	17.7	20.9	22.7	24.7	25.1	22.8	23.7
Annual Mean..	41.9	44.5	42.8	40.5	43.9	43.9	43.9	45.0	44.2	45.6	43.0
Mean for 6 mos., April to Sept....	56.2	60.5	58.7	57.3	58.3	57.9	60.8	60.8	59.5	60.5	58.4

The mean temperature of the year 1907 was 41.9 degrees, being 2.6 degrees below that of the preceding year, and 1.1 degrees below the mean temperature for the twenty-six years.

The average temperature for the six months April-September was also lower than usual, being 2.2 degrees below the average. March, September and December were the only months that were above normal. March was the warmest month relatively, being 4.4 degrees above, and May the coldest relatively, with 6.2 degrees below.

Sunshine. In the following table the averages of sunshine are, as usual, derived from the records of the weather stations at Woodstock, Toronto, Lindsay, Kingston and Ottawa:—

Months	Sun above horizon	1907	1906	1905	1904	1903	1902	1901	1900	1899	1898	1882-1907
	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.
January....	285.7	65.5	88.6	80.6	71.0	54.4	84.1	59.7	77.1	90.8	76.2	74.8
February....	291.4	116.6	135.4	116.1	109.0	90.9	127.7	115.7	108.8	112.8	69.3	103.8
March......	369.9	127.1	133.0	157.7	109.2	99.8	138.8	96.9	161.4	133.2	157.5	143.7
April.......	406.4	155.9	201.6	169.8	124.6	184.7	144.1	154.5	214.0	223.2	230.2	187.1
May.... ...	461.1	219.9	218.6	206.5	211.4	284.1	207.8	177.3	247.9	210.9	196.3	217.6
June........	465.7	230.8	228.8	210.4	228.9	196.0	199.3	365.5	305.3	278.2	237.1	241.6
July........	470.9	265.7	270.3	236.8	237.3	261.2	241.5	268.2	266.3	302.2	207.8	264.5
August	434.5	252.2	255.7	261.6	256.6	180.6	245.2	206.0	271.4	262.1	225.2	242.6
September..	376.3	129.6	237.7	194.6	172.8	203.7	149.3	199.7	190.0	164.4	202.4	187.1
October.....	340.2	153.9	125.7	151.8	124.4	152.4	119.1	163.0	164.0	141.7	118.2	139.3
November ..	286.9	63.0	84.2	95.9	100.1	114.0	76.6	80.3	82.4	78.6	89.0	77.9
December...	274.3	46.8	65.6	63.8	60.9	59.5	71.0	62.9	46.6	60.2	56.6	60.0
Total for the year........	4463.3	1827.0	2045.2	1945.6	1806.2	1881.3	1799.5	1852.7	2136.2	2058.3	1965.9	1940.0
Total for six months..... April-Sept..	2614.9	1254.1	1412.7	1279.7	1231.6	1310.3	1187.2	1274.2	1494.9	1411.0	1399.0	1340.5

The year 1907 had 1827.0 hours of sunshine, or 113 hours less than the average for the last twenty-six years. The six growing months, April-September, however, had only 1254.1 hours of sunshine or 86.4 less than for the period 1882-1907. The five months, February, May, July, August and October were above the average, October being highest with 14.6 hours; all the others were below, especially September which had only 129.6 hours of sunshine, or 57.5 hours less than the average for the twenty-six years period 1882-1907.

Precipitation. The fall of both rain and snow for the five winter months including November, 1906, and March, 1907, is given in the following table for ten years, together with the average for the twenty-six years, 1882-1907. An inch of water is the equivalent of ten inches of snow:—

Year.	November		December		January		February		March		Total for five months	
	Rain	Snow	Rain	Snow	Rain	Snow	Rain	Snow	Rain	Snow	Rain	Snow
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
1907........	1.92	3.7	1.80	16.3	1.85	15.6	0.14	15.8	1.64	7.8	7.35	59.2
1906........	1.96	6.0	1.22	8.8	1.34	10.2	0.46	8.1	1.13	11.6	6.11	43.7
1905........	0.33	4.3	0.55	14.6	0.22	23.2	0.06	20.5	0.98	3.6	2.14	66.2
1904........	0.98	7.2	0.71	24.1	0.48	24.9	1.04	14.7	1.78	9.4	4.89	80.3
1903........	1.60	4.0	1.06	14.6	0.78	19.8	1.31	13.6	1.92	1.7	6.67	53.7
1902........	1.25	8.0	1.85	14.2	0.10	20.4	0.56	12.1	2.34	2.5	6.10	57.2
1901........	2 99	10.4	0.51	8.6	0.58	18.8	R	17.6	1.60	13.1	5.68	68.5
1900........	1.13	1.0	2.15	14.5	0.72	15.8	1.68	26.8	0.53	18.8	6.21	76.9
1899........	1.67	9.6	0.74	24.6	1.50	13.2	0.76	8.0	1.78	22.1	6.45	77.5
1898........	3.40	8.9	1.73	17.5	1.47	18.2	0.60	18.9	2.42	1.0	9.62	64.5
1882-1907....	1.98	7.8	1.28	15.0	0.98	19.9	0.84	16.1	1.22	10.6	6.29	69.1

The total amount of rainfall for the five months, November-March, was 7.35 inches or 1.06 inch above the average for the same period for the twenty-six years, 1882 1907. The rainfall in January was 1.85 inches or 0.87 inches above average. The total snowfall was 59.2 inches or 9.9 inches less than the average for the five months ; November only recorded 3.7 inches or 4.1 inches less than the normal.

The six months, April to September, however, comprise what is regarded as the growing season for most crops, and the following table gives the rainfall of these months for the last ten years, and also the average for the twenty-six years, 1882-1907:—

Months	1907	1906	1905	1904	1903	1902	1901	1900	1899	1898	1897	1882-1907
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
April........	2.27	1.41	1.04	2.22	2.32	2.12	2.26	1.44	1.10	1.45	2.52	1.64
May.........	2.24	2.34	3.32	3.36	1.82	2.44	3.67	2.03	3.43	2.43	3.38	2.81
June.........	2.90	4.52	3.53	3.20	3.83	3.92	2.14	2.83	2.46	2.83	2.83	2.98
July.........	2.86	2.93	3.55	3.50	4.09	5.49	3.90	3.96	2.78	1.11	5.36	2.94
August......	1.00	2.57	3.26	3.76	3.77	2.02	2.78	2.15	0.81	2.64	2.62	2.57
September..	3.85	2.41	2.42	3.24	2.21	3.53	2.78	2.73	3.72	2.94	0.83	2.70
Total for six months.....	15.12	16.18	17.12	19.28	18.04	19.52	17.53	15.14	14.30	13.40	17.54	15.64

The rainfall for the six months, April-September, comprising the growing season was 15.12 inches, or 1.06 inches less than 1906, but when compared with the period 1882-1907 it is practically normal. April and September were above the average, while all the others were below, especially August, which showed a deficiency of 1.57 inches.

VEGETATION.

Reports were returnable on May 16th, and at that time vegetation was nearly two weeks behind its usual record. Only the earliest trees had started to leaf, and grass had made so slow a growth that there was a rather close bite for live stock on pastures.

Spring Seeding. Except on low land, or on very stiff clays, there was an excellent seed bed for spring grain; many May reports said "Never better." The cold weather, however, made growth so slow that it was difficult to estimate the extent of the catch, as correspondents wrote, but the general opinion was favorable. A large number of the returns reported seeding as being practically completed, while others stated that there was yet much to do. Owing to the comparatively poor outlook for fall wheat and clover, more oats and barley had been sown, and a greater acreage of corn was likely to be planted. The poorest reports regarding spring seeding came from some of the Lake Ontario and St. Lawrence and Ottawa counties, where wet land was delaying work.

THE GRAIN CROPS.

FALL WHEAT. The new fall wheat was thus described in the crop bulletin issued in November, 1906: "The splendid yield of fall wheat this year, and the almost entire disappearance of the Hessian fly, have encouraged farmers to sow a slightly extended acreage of wheat this fall. The crop was got in as early as August 25th, and sowing continued as late as October 10th, the bulk being got in in the first half of September. The seed bed, as a rule, was rather dry and lumpy for a good catch, but timely rains helped the crop to pick up, and most correspondents report the young wheat as looking healthy and ready for the winter. Very little mention was made of the Hessian fly or wire-worm."

While a few correspondents in May reported good fields of fall wheat, the bulk of the returns were more or less unfavorable. The crop looked promising in the late fall, and came through the winter in good condition, more especially where early sown; but the trying weather of April, with is alternate freezing and thawing, resulted in the killing out of a considerable portion of the crop, there being much heaving on heavy clay soils, and injury from ice on low-lying spots. More fall wheat than usual was plowed up, and much more would have been turned under were it not that grass had been seeded down with the wheat. A considerable quantity of barley and oats, however, was drilled into the bare spots for mixed feed. But little injury from insects was then reported, the white grub being most in evidence. The backward state of the spring growth prevented the forming of as accurate an opinion of the prospects of the crop as is generally available in May, but the conditions above described were more or less general in every district where fall wheat was grown.

The August crop bulletin said of fall wheat: "This crop has turned out to be much better than was anticipated. Considerable injury was done to it by winter-killing, and by the cold and trying weather of April and May, and a larger average than usual had to be plowed up or drilled in with barley or oats; but the fields rallied remarkably well, and the yield per acre will be a good one. The weather during harvesting was ideal, and the crop was housed in splendid condition. The straw was rather short, but stood up well and was very clean. The grain is an excellent sample in most cases, and will be well up to weight. Cutting ranged from the 15th of July to the 10th of August, the bulk of the crop being about two weeks later than usual. Very little mention was made of insect pests. The most favorable reports regarding fall wheat came from the Lake Huron, Georgian Bay, and West Midland districts."

November reports concerning fall wheat confirmed the rather favorable accounts given in the August bulletin regarding the crop. The yield was a little below that of 1906, but quite up to the average, and the general quality of the grain was classed as good and well up to weight.

THE NEW FALL WHEAT. The November bulletin thus summarized the condition of the growing wheat: "The acreage of new fall wheat will be somewhat increased in the Lake Erie and Georgian Bay counties, but will be about the usual extent in the other parts of the Province. Seeding was a little later than usual, owing to the backward harvest, but while operations ranged from the end of August to the third or fourth week of September most of the crop was got in during the second week of September. It has had an excellent start, but while green and healthy looking as correspondents wrote, there was hardly as much top as was desirable to ensure its taking the risk of an open winter. About forty varieties are reported as being grown, Dawson's Golden Chaff still being by far the favorite."

Spring Wheat: When correspondents reported in August most of the spring wheat was yet to be cut. The crop got a poor start in the spring owing to the very backward weather, but it picked up nicely, and a fair yield was promised. The straw was clean and the kernel plump. The main injury to the crop came from drouth and grasshoppers. Spring wheat appears to be steadily declining in favor with Ontario farmers.

Correspondents had little to say about spring wheat when reporting in August. The yield per acre was about an average, and the quality of the grain was placed at from fair to good.

Barley. Correspondents, according to the August bulletin, described barley as the best cereal crop of the year. "The cold, raw spring was against it at first, but it improved with the season, and notwithstanding the summer drouth it will give a yield over the average, and the grain will be exceptionally free from discoloration. Some barley yet remained to be cut, but the bulk of the crop was got in during most favorable weather. With the exception of attacks by grasshoppers in the Northern Districts, and occasional complaints of wire-worms, but little harm from insects was reported."

November reports regarding barley were on the whole favorable. There was a good yield of plump, well-colored grain, with longer and better straw than that of the other cereals.

Oats. "This will be relatively the poorest grain crop of the season," said the August bulletin. "It made a bad start in the spring, owing to the cold weather then prevailing, and did not stool well. In many sections of the Province farmers were much alarmed by observing that when the crop was heading the leaves of the plant began to turn red or rusty in appearance, and that in some instances the lower part of the heads failed to fill out. Some correspondents attribute this blight to the drouth and the heat; others assert that it was caused by the wireworm or an aphis; while others again hold that it was a touch of summer frost. However, the straw was not rusted, and warm rains later on helped the oat fields to recover to such a degree that a large measure of confidence was restored. The yield will be about three-fourths of that of recent years, while the grain will be light in weight in most cases, and hardly up to the mark in general quality. The straw will be short, but clean, and will make good fodder. Many farmers are cutting oats on the green side for two reasons: To escape the attacks of grasshoppers and to supplement the poor yield of hay. Harvesting began about the 5th of August, but was not general until about the 12th, and some yet remains to be cut."

Oats are the most important grain crop in Ontario, and this year it is poor, both as to yield and quality. It has been steadily increasing in acreage for the past nine years. In 1899, 2,363,778 acres yielded 89,897,724 bushels; in 1906, the yield had increased to 108,341,455 bushels. This year, while the area had increased 200,000 acres over 1906, the yield has dropped to 83,524,301 bushels, nearly 25,000,000 bushels below 1906. It has the smallest yield since 1896, with only one exception, that of 1901, when the yield was 78,334,490 bushels. According to the November bulletin, the strange rust-like blighting of the leaves of the plant, which was so general when the heads were forming, hindered the development of some of the kernels, and much light-weight grain was the result. Grasshoppers also injured the crop, more especially in the eastern and northern counties. The straw was shorter than usual, but was much cleaner than was expected.

Rye. Most of the rye grown in Ontario is used for feeding green or for plowing under. Only a few farmers raise the crop for grain, and then it is usually grown on poor soil. The crop this year was reported as being fair both as to yield and quality.

Peas. The August bulletin said: "The revival of pea growing will be strengthened by the experience of the crop this year, for it has been remarkably free from the weevil or 'bug,' and, notwithstanding the drouth, the yield will be large. The straw is of medium length, but it is clean and bright. The chief drawback to the crop has been its uneven ripening, full pods and blossoms sometimes being reported in the same fields. Harvesting will be late, pulling having been begun only as correspondents wrote."

Referring to peas the November bulletin remarked: "This crop is said to have been the best for years, there being an almost complete absence of the weevil which has done so much injury to the crop for several seasons. The straw has also turned out well as to length and quality. Pea-growing in Ontario, according to correspondents, is likely to increase in acreage next year."

Beans. Frost on the night of the 3rd of July did much damage to the bean crop, and a considerable amount of re-planting had to be done. This, together with the lateness of the growing season, has made it difficult to estimate the probable yield of the crop, when correspondents reported in August, as many of the vines were still in blossom. Early beans a light yield, but late planted a fair crop should favorable weather prevail, was the outlook at that period.

November returns were to the effect that beans were slightly touched by frost in July and September, and suffered a little from wet weather at harvesting. They were fairly podded, and on the whole were of good quality, considering the lateness of harvesting.

Buckwheat. This crop suffered from frost more than any other of the grains, more especially in the eastern half of the Province. Notwithstanding this drawback, both the yield and quality of buckwheat are reported to be good, and the crop is said to be coming more into favor.

Corn. "Much interest is taken in the corn crop this season, on account of the shortage of hay," said the August bulletin. "The acreage is larger than in the last year or two, but owing to the cold and otherwise unfavorable weather at the time of seeding, a great deal of re-planting had to be done. This means that much of the crop is quite late in growth, and renders an opinion as to its final condition rather doubtful. It is safe to say, however, that should favorable growing weather continue, and corn escape early autumn frosts, there will be a good general yield. The drouth was beginning to tell upon the crop as correspondents wrote; crows and wire-worm were also complained of."

The November bulletin had the following to say regarding corn: "Notwithstanding the lateness of the spring, early planted corn came through in generally fair condition. Some of the crop was put in rather late, however, owing to replanting, but only a small percentage was caught with frost in the fall. A few complaints were made of soft corn, but in most instances the crop was regarded as being of good quality, the stalks being shorter than usual, but well cobbed. The yield per acre is not up to the average, but the acreage was larger than in the years immediately preceding. The fact that grasshoppers attacked the corn this year is regarded by some correspondents as something uncommon."

HAY AND CLOVER.

Like fall wheat, clover suffered greatly from the trying weather of April, many fields badly heaved by frost, or injured by ice forming. On warm sandy soils, and on well-drained clays, some excellent fields were reported when correspondents wrote in May, but on the whole the crop came through the winter and spring in poorer condition than for years, and no section of the Province was exempt. The backward spring made it hard for correspondents to then estimate the extent of the loss, some holding that a large area would have to be plowed up, while others stated that a timely and vigorous use of the land roller would restore fields to a promising condition when growth got well started.

The August bulletin had the following regarding hay and clover: "Two years in succession of winter-killing have proved too much for clover, and the average yield of hay will be the poorest for many years. The cold spring, followed by hot and dry weather, was hard on meadows already severely tried by the winter, and a light cut is reported taking the Province as a whole, although here and there good yields are returned. Timothy did better than clover, but the general result may be regarded as a relative failure of hay so far as the yield is concerned; indeed, a number of farmers scattered over the Province report only half a ton to the acre, and will have barely a sufficient supply for their live stock. The most cheering fact concerning hay is that the crop is cut, cured, and got under cover under excellent conditions, and is of superior quality. Cutting was not general until the middle of July, being about two weeks later than usual. The second growth of clover was making a poor start owing to the drouth. Several correspondents speak favorably of lucerne or alfalfa as a hay crop."

CLOVER SEED: Clover fields kept for seed were rather thin, owing to the very trying winter, the late spring, and midsummer drouth. The heads were well filled, however, and some fair yields of seed are spoken of by a few, although in most cases the return will be light. The midge was evident in several localities, but no serious injury from it was reported. Many clover fields were closely pastured by cattle, owing to the scarcity of hay and feed.

POTATOES AND ROOTS.

POTATOES. The August bulletin stated: "Owing to late planting and midsummer drouth, this crop has not made as much growth as usual, and the tubers are described as being rather small in size. Many correspondents, however, are of opinion that timely rains and favorable weather may yet bring the yield up to fair proportions. Bugs were plentiful, and as they were most in evidence during early harvest, were much neglected. Blight has appeared in many sections, but practically no rot has been reported, which means much in the light of the fact that for the last two or three years rot was more or less common at this time of the year."

The following appeared in the November bulletin: "Accounts regarding the yield of potatoes vary greatly, some splendid returns being reported alongside of light yields. A statement for the Province generally may be thus summarized: A good yield, the tubers being rather smaller than usual owing to drouth, but with great freedom from rot compared with the experience of more recent years. In fact, the excellent quality of potatoes is the marked feature of the reports concerning the crop. Early planted did not fare so well as those put in late, owing to early summer drouth. The most unfavorable returns regarding potatoes came from the Lake Erie counties, where some rot appeared on low and heavy lands. There was good weather for storing the crop."

Carrots. Judging by the infrequent references to this class of roots, carrots appear to be falling off as a field crop. Where described, however, they are said to have done well both as to yield and quality.

Mangel-Wurzels. According to the August bulletin mangels were doing better than turnips, and the prospects of yield were from fair to good. In dealing with mangels the November bulletin said: "These roots are not so large in size as usual, but while a few reports put the crop below the average in yield and quality, the bulk of the returns place it as from fair to good. Storing was completed when correspondents wrote."

Turnips. When correspondents wrote in August turnips were said to be very small, and they were suffering from fly and grasshoppers; but it was then believed that timely rains would bring the crop into good form. The November bulletin said: "This crop suffered from drouth and from the louse, and the yield will be light, and the roots small in size. Some good fields are reported, but the bulk of the returns range from fair to failure. Most of the crop has been got in, but some yet remain to be housed."

Sugar Beets. These roots yielded fairly well where grown, but were somewhat smaller in size than usual, although of good quality.

FRUIT AND FRUIT TREES.

Fruit. May reports were to the following effect: "The very backward state of the weather has prevented correspondents from reporting fully and accurately regarding the condition of orchards, as the stage of growth is nearly two weeks later than usual, and in most parts of the Province fruit trees had not got into leaf or blossom when reports were sent in. Several correspondents speak of plum trees dying, but some attribute this to the severe winter of 1903-4 having told on the vitality of the trees. Other fruit trees have come through in good condition, and give fair promise of fruiting should spring frost be escaped. Complaints are made of injury from the San José scale and the oyster-shell bark-louse, but more spraying than ever is being resorted to in order to overcome these and other orchard pests. Several correspondents report injury to small fruits by the winter."

The August bulletin said: "This has not been a fruit year, the yields of all sorts falling more or less short of an average. Apples, while good in odd sections, more especially in Northumberland County and vicinity, will give on the whole a comparatively light yield; several correspondents estimate it at a half crop. This fruit, however, will be freer from scab and worm than in more recent years. Pears are in the same class as apples this season. Plums will be scarce, taking the Province over; the curculio has, as usual, stung and destroyed an immense quantity of this choice fruit. Peaches are the poorest of the orchard crops; there will be less of them for market than for many years. Cherries were a fair crop, but black-knot is steadily killing off the trees. Orchard fruits suffered considerably from drouth, and were all inclined to be small in size; high winds also thinned out much of the fruit. Grapes will be the best fruit of the year should the autumn be favorable. Strawberries, raspberries and other small fruits were not so plentiful as usual."

Orchard conditions were thus dealt with in the November bulletin: "Fruit trees, as a rule, are in good condition, except where attacked by the San José scale, oyster-shell bark-louse, tent caterpillar, and other insect enemies. Apples were not up to the average in yield, but large shipments have been made, and a surplus of winter varieties is still available. Apples are not so large in size as ordinarily, owing to the drouth and the lateness of the growing season. Many complaints have been made of the codling-worm, but there has been less scab than in recent years. Plums were more plentiful than was anticipated early in the season. Peaches were very scarce, but grapes gave a large yield, although in many quarters late varieties were caught by frost. Taken as a whole, the season was not up to the average as an all round fruit year."

MISCELLANEOUS.

Flax: Flax is not now grown to a large extent. It averaged about a ton and three-quarters to the acre, and was regarded as a fair crop generally.

Lucerne. This crop is increasing in favor. Many farmers are experimenting with small patches of it, and the general opinion is favorable, as it stands the drouth pretty well, and several cuttings are available during the season.

Rape. A considerable number of farmers in Ontario grow rape for feeding to live stock in the fall, sheep and hogs more especially thriving upon it. In some districts the plants were attacked by an aphis and did not do so well as usual.

Tobacco. The August bulletin had the following: "Tobacco-growing in this Province is confined chiefly to the county of Essex. The crop was got in unusually late, owing to the cold spring weather, and the plants are reported to be rather small and uneven. The summer, while warm, was rather dry for tobacco, although several correspondents claim that the quality of the leaf will be good."

The November bulletin said: "The early part of the season was so cold and uninviting for tobacco that the plant made slow growth, and, as one correspondent put it, 'it took all the time there was to get it finished growing.' In nearly every case, however, it escaped the frost, and was well harvested. The acreage was not so large as that of the previous years."

Weeds: Several correspondents complain regarding the prevalence of weeds, and some of them are of opinion that the time has come when more advanced and effective measures should be taken toward abating the nuisance.

Fall Plowing: Plowing on stubble was practically completed, and work was well advanced on sod and root lands by the 11th of November, and there was a promise of open weather for the completion of the task.

Threshing and Marketing. Notwithstanding the rather late harvest, threshing was well advanced, and in most cases completed, by the end of the first full week of November. Some correspondents suggest that the short straw facilitated the work. Marketing has not been so general as usual, owing to the scarcity of grain and fodder crops. Relatively more wheat and barley than oats have been disposed of, the high prices enticing sales; but most farmers have been careful not to deplete their stores until they find how they can carry their live stock through the winter.

Farm Improvements. Considerable advance has been made in every branch of farm improvement, but not quite so much as in the last two or three years, owing to the scarcity of skilled labor, and the late spring shortening the working season. A good deal of wire fencing, chiefly of woven wire, has replaced the old rail and other wooden fences, and the wire now used is of a heavier quality than formerly. Many new houses and barns have been built, but the most general improvement in the way of buildings has been in the raising of barns and the placing stone, brick or concrete stables underneath. More attention than ever before has been paid to the matter of water supply and feeding conveniences in the handling of live stock.

LIVE STOCK AND THE DAIRY.

The May bulletin said: "When live stock went into winter quarters, it was felt that more than ordinary care would have to be exercised in their feeding and handling, as hay was not so plentiful as usual, and mill feed was high in price. The early part of the winter was favorable, and the warm weather of March augured an early season upon the grass; but the keen, raw weather of April and the backward growth of the first half of May upset all calculations, and when correspondents wrote, fodder supplies were short with many, and in some cases live stock had to be turned out on pastures that were hardly forward enough to sustain them. Cattle are not in as good spring condition as usual, being on the lean side as a rule, although, with the exception of some losses from scouring, and a few local cases of abortion in dairy cows, they are generally free from disease. The fact that they were put on grass later than usual is also against them. Horses, owing to the high prices now being paid for them, are being better cared for than ever. Some distemper has been reported, but generally of a mild form. The cool weather during spring work was in their favor. Sheep are gaining in favor, and are doing well, although the usual losses in lambing are reported. The fatalities in spring litters of pigs have been serious, but otherwise this popular class of live stock is favorably spoken of, and shipments are being regularly made to the packing houses. The unusually long confinement of farm animals told heavily on fodder stores, and skilful husbandry will be required to maintain live stock in good shape should the summer be at all unfavorable."

Live stock conditions were thus dealt with in the August bulletin: "Owing to the late spring, and the scarcity of fodder, all classes of live stock were turned out upon grass before there was much growth, and they have kept the pastures pretty closely cropped. Grasshoppers and drouth also helped to thin the fields. When correspondents wrote about the middle of August, pastures in most sections were rather dry, and in some instances cattle had to be fed hay. The horn fly is spoken of as having been very annoying to live stock, more especially to dairy cows. The milk flow was good during June, but it has fallen off considerably, and dairy supplies are lighter than usual at this time of year. Live stock of all classes, while thinner than desirable, are otherwise in good condition, practically no mention being made of disease. Fodder of all kinds will be scarce, and in most cases great care and economy must be practised if live stock are to be brought through the winter in fit condition. More dependence than ever before will have to be made upon straw and corn as supplementary feed. The former is remarkably clean, and is said to be of excellent quality for feeding purposes, while the latter is still growing in the fields, and is having a race against frost."

The November bulletin stated: "Except in a few favored localities pastures have been poor, and live stock were in rather thin condition for wintering, although remarkably free from disease. Horses are in good form, but are selling at reduced prices. The high cost of hay, grain, and bran and other millfeeds, has kept most farmers from fattening the usual number of cattle and hogs, but this phase of the live stock industry is dealt with more in detail under the heading 'Live Stock and Fodder Supplies.' The number of brood sows and little pigs sold or slaughtered this fall augurs seriously for bacon production next year. Sheep have been in excellent condition, the dry weather and short pastures suiting them much better than other stock. The dread of the dog is given as a great hindrance to our sheep industry. The silo has this year made a strong argument for its existence, and a number of new ones are being erected in various parts of the Province."

POULTRY. The following appeared in the November bulletin: "Reports regarding the condition of poultry are on the whole favorable. Eggs have commanded a good price, and have paid much better than fowl for the table. A few correspondents express the opinion that the too general use of the incubator is having a tendency to over-supply the market with chickens, and thus depress prices. The high price of grain also has forced fowl upon the market. A correspondent points out that the season was a good one for turkeys owing to the abundance of grasshoppers. Ontario farmers are now paying more attention to poultry along the lines of selection, feeding, housing, and general care."

THE DAIRY. Pastures failed early owing to drouth, and the milk flow decreased in sympathy; but the good prices for dairy products about balanced matters, and, even with the high price of feed, milk paid relatively better than where cattle were raised for beef. Cheese was regarded as a paying industry, although some factories had to close early for want of milk. Butter-making appears to be coming more into favor with our farmers. The general quality was up to the mark, and prices were from three to seven cents a pound better than last year's figures. Shorthorn grades are still in the majority as dairy cows, but Holsteins and their grades are rapidly gaining in popularity as milkers.

CHEESE FACTORIES. The number of cheese factories reported in operation in 1906 was 1,237. The output of cheese was 157,418,139 pounds, as compared with 164,866,223 in 1905. However, the average price per pound showed a further advance, and the total value was $18,569,207 in 1906 as compared with $17,417,757 in 1905, and $12,908,118 in 1904. The estimated amount paid to 58,193 patrons was $16,601,482, while in 1905 the 56,960 patrons received the sum of $15,599,602 for milk delivered at the factory. This is equivalent to 98.1 cents per 100 pounds of milk in 1906, as against 89.6 in 1905 and 66.5 in 1904.

CREAMERIES. The number of creameries operated in 1906 was 106, while butter was made in 109 cheese factories having butter plants for spring and fall making. Many other factories are so equipped but did not make any butter in 1906. Many of the creameries operated all the year, while others made no butter, having confined their business to shipping cream and ice cream. The following are comparative statistics for ten years:

Year.	No. of creameries in operation.	Butter made.		Average No. of patrons.	Average price of butter per pound.
		Quantity.	Value.		
		lb.	$		cts.
Creameries................	106	10,126,875	2,237,939	17,105	22.10
Cheese factories...........	109	1,162,251	275,983	3,926	23.75
Total:.................					
1906.................	215	11,289,126	2,513,922	21,031	22.27
1905.................	241	10,142,289	2,131,554	19,184	21.02
1904.................	248	9,625,021	1,785,911	18,330	18.55
1903.................	265	10,812,126	2,096,593	19,602	19.39
1902.................	282	11,082,078	2,181,400	21,672	19.68
1901.................	286	9,047,260	1,798,264	19,896	19.88
1900.................	308	9,041,468	1,819,290	21,809	20.12
1899.................	323	9,113,964	1,746,362	22,090	19.16
1898.................	282	9,008,992	1,632,234	22,741	18.12
1897..............	214	7,708,265	1,403,609	18,909	18.21

The estimated amount paid to patrons in 1906 was $2,175,248 as against $1,827,285 in 1905.

LIVE STOCK AND FODDER SUPPLIES.

The following appeared in the November bulletin:—

In view of the comparative failure of the hay crop, and the high prices of grains and millfeed, special enquiries have been made by the Department regarding the prospects and conditions for wintering live stock. Correspondents have freely responded, and the replies are here presented, by counties, with a summary of the conditions in each county.

In every section of the Province the scarcity of fodder is more or less felt, the feeling varying from extreme hardship to an opinion that more care will have to be taken in feeding. A cheering feature of the returns is the fact that a number of correspondents speak of the panic as having abated, and late reports are on the whole more reassuring than those received earlier.

The commonest way of meeting the situation is to reduce the number of live stock. The result is that an immense quantity of beef has been prematurely unloaded on the market, at the mercy of local buyers in many cases, and at prices that left no profit for the raisers. Prices of good two-year-old steers have ranged from 25 to 50 per cent. below the figures for similar animals in recent years. In many instances, more especially in the St. Lawrence and Ottawa counties, old cows, or "canners," have been disposed of at from $4 to $8 each. Less beef cattle are being fattened than in former years, and a scarcity of prime beef in the spring is predicted. Cattle have gone into winter quarters in thin condition, but no word of disease in any class of live stock has been reported.

The swine industry is being threatened in many quarters owing to the reluctance of farmers to hold pigs when grain and other feeds are so high in price. The consequence is that an unusual number of brood sows are being marketed, and small pigs have been sold at slaughter prices; indeed, in some instances being practically given away. Several correspondents fear that the bacon industry will suffer severely next year on account of the shortness of stock.

Poor horses are being sold cheaply, or are sent to the knackers, but good working horses are keeping up in value better than other live stock.

While the general prospect is serious enough, there is no cause for alarm regarding a fodder famine. There will be enough hay, straw, corn, and grain, with the usual purchase of bran, shorts, and other millfeeds, to bring live stock through an ordinary winter; there is a sufficient surplus in the Province to balance any deficiency. In some of the more eastern townships Quebec hay has been imported, but pressers have sent more Ontario hay out of the Province. The situation is the keenest for years in the history of Ontario agriculture, but the summary of the statements of correspondents which follow will show that they believe they have conditions well in hand, and that careful feeding and judicious handling will enable most owners of live stock to come out all right in the end.

REPORTS BY COUNTIES.

Essex: The comparatively light yield of corn has compelled owners of live stock to make inroads upon their supply of hay and the cereals. However, with close feeding cattle and other live stock will be safely wintered, while some hay and grain will be ready for sale should high prices tempt the owners.

Kent: Some of the farmers in this county are reducing the number of their animals, but there appears to be a sufficiency of food on hand to carry live stock comfortably through the winter, although in some cases young pigs are being disposed of at a sacrifice.

Elgin: Opinions are practically unanimous that careful feeding will meet the emergency, so far as wintering live stock is concerned, although there will be but little surplus of hay or grain. The number of live stock is being reduced at low prices.

Norfolk: Farmers are carrying as few live stock as possible through the winter, owing to the shortage of fodder. Cattle are thin now, and will likely come out thin in the spring, owing to close feeding. A few have a surplus of hay, but most have just a sufficiency. Roots and straw have helped to save the situation.

Haldimand: Live stock are being reduced, but are not being sacrificed, and those that are left will be carried through nicely, although very little stall feeding can be done. A Canboro' correspondent deprecates the cleaning out of surplus hay so early by packers. Present prices for hogs are said to bear hard on swine raisers.

Welland: Farmers are making sure of wintering live stock by reducing the number of animals, even though prices are not satisfactory. Fodder of all kinds is scarce and dear, although here and there hay and grain are on sale.

Lambton: There will be enough feed to carry live stock over the winter, more especially as inferior cattle and small pigs are being got rid of at almost any price. Some correspondents have fears as to next year's supply of hogs.

Huron: Many farmers in this county will have a close call in carrying their stock over the winter, although in most cases careful feeding, the silo, and the use of chopped straw will help out. A good many are getting rid of surplus stock early, at reduced prices. Lean cattle, however, cannot find buyers. The high price of bran and shorts add to the difficulties of handling stock this winter.

Bruce: A large number of cattle have had to be sold at a sacrifice owing to the scarcity of fodder, and those kept over are very thin. Horses are also hard to dispose of. It will require good judgment on the part of feeders to carry live stock successfully through the winter.

Grey: Farmers in this county are getting over the panicky feeling that prevailed earlier in the season, but are aware that only careful feeding during the winter will win out. All feeding stuffs are scarce and dear, and straw is being more utilized than ever before. Cattle are being freely disposed of, some two-year-olds going for two cents a pound. Cattle that last year would bring $30 now bring only $20.

Simcoe: Cattle are healthy, but thin, and only the most careful feeding will bring them through the winter in proper condition. A number have been disposed of at low prices. A large number of sows have been marketed, and a shortage of hogs next year is feared. Very little hay is for sale, except at famine prices, but there is a surplus of barley and wheat in some townships.

Middlesex: Cattle and other live stock, except hogs, will be carried over the winter where careful feeding is practised. A sacrifice of sows and young pigs is being made by some farmers. Good cattle bring fair prices, but lean animals and farrow cows sell for very little. A small surplus of hay is on hand at high prices.

Oxford: Reports from this county are hopeful regarding the successful wintering of live stock, owing to a reduction in the number of cattle held over, and the fact that fewer hogs will be kept for fattening. One correspondent regards the present prices of mill feeds as prohibitive. There will be a surplus of hay and oats should their prices hold up.

Brant: There will be enough food for live stock where care is exercised. Cattle are not in fit condition generally, owing to dry pastures and the high price of grains. In some quarters young pigs are being recklessly disposed of at low prices, and future supplies of hogs are thus threatened. Straw is in demand at a good price.

Perth: There is very little surplus food on hand, but close feeding will bring live stock safely through the winter. Some have sold good beef cattle at fair rates; but low prices are also reported, especially where offered at auction sales. Hogs are described as being a drug on the market. Some are selling hay who are likely to need it before spring.

Wellington: The reports from this county as to food supplies are on the whole cheerful. In some townships there is a good surplus of hay, and roots are also on hand in large quantities. But for all this, cattle are being sold at much reduced prices compared with former years, and young pigs are being disposed of for next to nothing.

Waterloo: Farmers are largely depending upon the coarser fodders to carry live stock through the winter. A good many unfinished cattle have been sold at prices far from satisfactory. Some barley and hay are being disposed of owing to the high prices offering.

Dufferin: Food for farm animals is rather scarce, but owing to the fact that many less beef cattle are being kept over there will be but little difficulty in meeting the call. Cattle are being sold off at exceedingly low rates. A fair surplus of hay could be disposed of on demand.

Lincoln: There will be enough food on hand to bring live stock nicely through the winter. Hay is about the only fodder for sale. Very few cattle are being fitted, but many are being sold by auction at low prices.

Wentworth: There will be plenty of food for live stock, as farmers are selling off cattle that in other years they would be fattening. Hay is being steadily disposed of at very high prices. In one township straw is quoted as bringing $10 a ton.

Halton: No anxiety is felt by correspondents regarding the wintering of live stock; but careful feeding will be necessary. There is no sacrificing of beef cattle, and the usual number of dairy cattle, or more, will be kept. Hogs, however, will not be kept over in such numbers as in more recent years. Old horses are regarded as a burden. Some farmers have a surplus of hay for sale.

Peel: This county has been favored with good crops, and there is a surplus of hay, barley and oats. Live stock are being reduced, but at the normal rate, except hogs, which are being sold rather prematurely.

York: There are plenty of roots and other rough feed, but hay and grains are scarce and dear. Some hay and barley are being sold, but a few are buying corn. Very little attempt is being made to fatten live stock. A considerable number of cattle, hogs and sheep are being sold at auction sales at reduced prices. It is the general opinion that stock on hand can be comfortably wintered with care.

Ontario: There is a feeling here that the panic is about over. Many farmers were overstocked, but considerable live stock have been sold off during the last month or two, and the remainder can be carried over nicely with prudent handling; as there is a fair supply of roughage, and all classes of feed, though scarce, are of good quality. Poor animals sold cheaply, but those in good condition commanded reasonable prices.

Durham: There will be a sufficiency of food for live stock, but there has been a great falling off in the number of cattle being fattened, and there are many dry cows. It is feared that hogs will be short next year, as an unusual number of brood sows are being sold on account of the scarcity and dearness of grain. Hay is held at a high price.

Northumberland: Fodder generally is scarce, but the good yield of roots has helped out the situation. Some are selling cows and young stock at low figures, but there is a tendency for farmers to hold on to their food supplies. It is pointed out that there is an unusual disposition on the part of owners of live stock to exercise care in feeding so as to prevent waste. One correspondent ventures the opinion that food will be easier to buy in spring than now.

Prince Edward: The prospects of wintering live stock are not bright, owing to the scarcity of hay and straw, and the high price of grain and mill feed. Cattle are being disposed of at prices that exclude profit. In some cases good cows are selling at from $10 to $20 each.

Lennox and Addington: One correspondent avers that fodder and grain for wintering stock have not been so scarce since 1888, and others also speak of the general shortage. Straw and hay command unusually high prices. Cattle are selling at greatly depressed prices; "canners" bring only $5. Small pigs are selling at panic prices, and fears are expressed as to next year's supply of hogs.

Frontenac: The prospects for wintering stock in this county are poor, as fodder of all kinds are scarce and dear. Young beef animals and cows are being sold at exceedingly low prices, owing to the scarcity of feed. One correspondent takes comfort in the thought that the best cattle are being retained, and holds that too many animals were being pastured for profit.

Leeds: The prospects for wintering live stock aro far from encouraging. Very few have a surplus of fodder, and many have a shortage. Medium and poor cattle are being sold at amazingly low prices in order that their owners may avoid keeping them. A large number of hogs are also being disposed of.

Grenville: A large number of cattle are being sold on account of the small quantity of hay and other food on hand. Some farmers will have to purchase hay, but it is high in price and is very scarce in the townships.

Dundas: There is barely a sufficiency of food for live stock, and to insure carrying the best beef and dairy animals through the winter a large number of dry old cows are being sold as canners at from $4 to $8, and poor beefing animals are also being closely culled. Cattle generally are thin, but no disease is complained of, and the choicest animals, both beef and dairy, are still valued at former prices.

Stormont: The conditions in this county are practically the same as in the neighboring counties.

Glengarry: With careful feeding there will be sufficient food for stock during the winter, although the high price of grains will limit the number of beefing animals. Some old milkers are being sold as low as two cents a pound. There will be a small surplus of hay and some oats for sale, the former now selling at from $16 to $17 a ton.

Prescott: There will be enough food for carrying stock through the winter. Hay and straw have been shipped to outside points, and some oats, but no other grains are being sold. Cattle are bringing low prices, and some old horses, to quote a correspondent, are being killed without ceremony.

Carleton: Feed is scarce, and much more straw is being fed than formerly. Some will have to purchase supplies for stock feeding. There are few cattle being fattened; in fact, all class of live stock are in rather thin condition. Hay ranges from $18 to $20 a ton in price, and is scarce at that. Prices for live stock are uncommonly low.

Renfrew: The coming winter will be a trying one to owners of live stock, as food supplies are exceedingly scarce. Farmers are meeting the situation by selling off cattle at rates which shut out profit, as the market is glutted with beef. Old horses and colts are also being sold at a sacrifice. Hay is selling at $20 a ton.

Lanark: Food supplies for live stock are very short. In some instances it has been necessary to bring in hay from the Province of Quebec. Cattle are being forced on the market, but buyers are scarce, and butchers are fully supplied, and prices are not paying farmers. One correspondent states that good horses are selling well.

Victoria: All kinds of fodder are so short in supply that it will take the greatest care to carry live stock through the winter. Some are selling off their poorest animals in order to carry over the remainder; but in very few cases will there be much stall feeding done. Dairy cattle have dried up early owing to poor pastures. Hay is scarce at $18 a ton.

Peterborough: Reports differ as to the extra sale of live stock owing to the fear that supplies of food would be short. The general opinion, however, is that with economy nearly all farmers will be able to carry their stock through the winter. Young pigs are being sold at low prices. A limited quantity of hay and grain is being sold.

Haliburton: While a few have a small surplus of hay and oats, and the former is selling to outside purchasers at $18 a ton, the majority of farmers have hardly more than enough feed to carry their stock through the winter. Very little has been done by farmers in the way of buying supplies, but many are selling off cattle at prices that are away down—in some cases from $1.50 to $2 a cwt., live weight.

Hastings: It will require very close feeding to carry stock through the winter, and this is being made more sure by the disposal of a large number of cattle at prices greatly reduced from those ruling in recent years. Hay is scarce and dear, and straw is also at a premium, in some cases being sold at $10 a load. Some will have to buy supplies for their stock, and there will be considerable difficulty in procuring it.

Muskoka: Food for live stock is so scarce that nearly every farmer is getting rid of some of his cattle, and so much beef is being put on the market that only the better class of animals are saleable, even at the low prices offered. One correspondent claims that there will not be more than half the usual number of beef cattle on hand in the spring. Hay is $20 a ton, and all other stock food in proportion.

Parry Sound: The strictest economy in feeding will be necessary as all kinds of cattle food are dear and scarce. Straw and oats are especially below requirements, and hay sells at from $17 to $20. Owing to the shortage of feed but little fattening of beef will be carried on, and not much winter dairying will be done. One correspondent states that cattle and horses have dropped 25 per cent. in value since last year.

Manitoulin: The prospects of wintering live stock on this island were never more depressing. Even though large numbers of live stock have been sold off, there will be a scarcity of food. Hay at $24 a ton, and oats and millfeed in proportion, are being purchased.

Nipissing: There will be a sufficiency of hay with careful handling. Wild or beaver hay is worth $12 a ton, and clover and timothy hay $20 a ton. Farmers are selling off some of their extra cattle so as not to have to purchase grain or millfeed, which are abnormally high in price.

Thunder Bay: Cattle have been sold off rapidly so as to reduce their numbers, owing to the scarcity and dearness of fodder of all kinds. Hay costs from $22 to $26 a ton. The low prices for beef do not encourage feeding, and there will likely be a surplus of food after all.

Algoma: Farmers are selling off many of their stock at a sacrific, in order to carry the remainder over winter. Only a few will have a surplus of feed on hand. Hay sells at $20 a ton and oats at 75 cents a bushel. Wild hay costs $12 a ton.

Rainy River: There is a surplus of hay and other food for live stock, and cattle are in good condition. But for the high price of millfeeds things could not be in better condition. Hay sells at from $14 to $18. according to manner and place of delivery.

BEES AND HONEY.

August returns concerning bees were to the following effect: "The cold and very late spring was hard upon bees. There was much winter-killing, and those that survived got a poor start owing to the backward condition of vegetation. Swarming was not satisfactory as a rule, and there has not been the average increase in the number of colonies. Clover was scarce, and bees had to depend more than ever upon basswood, buckwheat, and other nectars. Yields range from 5 to 100 pounds, but will average barely 30 pounds per colony, spring count. Foul brood has been occasionally reported, and has been closely looked after by the inspectors."

The November bulletin had the following regarding the apiary: "The honey flow this season was very light, owing to the cold and backward spring and the summer drouth, but the quality is better than that of last year's honey. In some quarters, more especially in Eastern Ontario, feeding back has been necessary. Scattered cases of foul brood have been reported, but the general health of bees is said to be good."

LABOR AND WAGES.

The following statement appeared in the August bulletin: "Correspondents are about equally divided as to the scarcity or sufficiency of farm help, but are practically unanimous as to the poor quality of much of the labor now being offered on Ontario farms. Owing to the hay crop being light, and all classes of grain standing up well on short straw, together with the very open and favorable weather for harvesting, farmers were able this summer to get along with less help than usual. The use of wider agricultural implements and other modern appliances is also enabling them to get along with less hiring of labor. Interchange of work by neighbors is commonly practised, one correspondent remarking that this makes them 'masters and servants by turns'. Wages range from $1 to $2 a day, and from $18 to $30 a month, with board. Some skilled farm laborers get as high as $50 a month during harvest."

November conditions were thus described in the bulletin issued in that month: "While a considerable number of correspondents hold that there was an adequate supply of farm labor during the working season, the greater part of the reports speak of a scarcity, more especially of men of the right quality. While some of the immigrant help are favorably referred to, more frequently there is a remarkable outspokenness as to the unfitness of many of the Old Country men offering for Ontario farm labor. As to the rate of wages, correspondents are almost unanimous in declaring that it is not likely to go higher, as farmers cannot afford to pay more. A number of the reports suggest a fall in price of farm labor, in sympathy with the dulness now beginning to affect some of the town industries. Improved farm implements and the co-operation of neighbors are also helping to relieve the strain. Domestic servants on the farm were never more difficult to procure."

INSECTS AND PLANT DISEASES.

The following statement has been prepared by the Entomological Department of the Ontario Agricultural College:

Very few complaints of fungous and other diseases of plants were sent in during the past season. This immunity was, no doubt, largely due to the dry weather which prevailed throughout the greater part of Ontario during July and August, and which was unfavorable to the growth of these minute organisms. The blight which affected the oat plants in many localities was not caused by any insect of fungous attack, but appeared to be the result of the cold and backward season and the frosts in May. Green plant-lice (Aphides) were abundant on oats in some places, and caused a considerable amount of damage, but they were not responsible for the unusual blight. Where their injuries were more severe than in ordinary years, it was probably owing to the inability of the weakened plant to withstand this drain upon its system. Potatoes have been little affected by rot in the tubers or the fungous disease of the foliage.

The Raspberry Root-gall, the effect of a fungous attack, has been complained of in many instances. It seems to have spread especially in nursery stock, where plants are crowded together and their roots become interlaced, facilitating the transmission of the disease from one to another.

The most remarkable outbreak of the year was that of the variegated Cut-worm, which appeared in vast numbers near Leamington, devouring everything before it. In many other localities it was very abundant and caused much damage to green tomatoes, vegetables and garden flowers. A full account of the insect is given in the Entomological Report for 1907.

Turnips and cabbages have been badly affected by plant-lice during the autumn, and considerable loss has been met with in many places.

TEMPERATURES OF 1907.

TABLE I.—Showing for each month the highest, lowest, mean highest, mean lowest, and mean temperature at the principal stations in Ontario in 1907; also the annual mean for each station.

Months.		Southampton.	Birnam.	London.	Woodstock.	Stoney Creek.	Toronto.	Lindsay.	Gravenhurst.	Ottawa.	Rockliffe.
		°	°	°	°	°	°	°	°	°	°
January	Highest	57.8	58.7	57.0	56.0	58 0	51.4	46.9	49.0	46.0	50.0
	Lowest	−16.1	−13.0	−14.0	−14.0	−13.0	−10.0	−16.0	−33.0	−20.0	−38.0
	Mean highest	28.8	27.9	29.8	28.6	31.8	28.3	24.2	23.0	18.3	15.8
	Mean lowest	14.3	17.7	15.0	13.0	16.2	15.7	8.3	2.8	2.9	− 8.2
	Monthly mean	21.6	22.8	22.4	20.8	24.0	22.0	16.3	12.9	10.6	3.8
February	Highest	42.0	46.4	43.0	41.0	45.0	41.0	36.6	36.0	38.0	35.0
	Lowest	−13.1	−10.0	−11.0	− 7.0	− 7.0	− 6.1	−22.5	−42.8	−19.0	−39.0
	Mean highest	27.3	24.5	26.7	25.7	27.3	26.0	22.6	20.9	17.1	17.2
	Mean lowest	5.8	9.5	8.5	7.0	10.2	10.2	− 0.2	− 5.9	− 1.2	−10.3
	Monthly mean	16.6	17.0	17.6	16.3	18.7	18.3	11.2	7.5	7.9	3.4
March	Highest	60.3	67.5	68.0	65.0	69.0	63.9	62.1	61.0	55.0	61.0
	Lowest	− 1.2	5.0	8.0	6.0	3.0	5.8	− 6.0	−18.0	−15.0	−28.0
	Mean highest	40.3	41.1	44.5	42.1	44.4	40.9	39.3	38.0	35.2	36.3
	Mean lowest	22.3	27.0	26.8	22.7	26.4	27.0	20.8	16.2	18.8	10.3
	Monthly mean	31.3	34.0	35.7	32.4	35.4	33.9	30.1	27.1	27.0	23.3
April	Highest	61.8	70.0	70.5	69 0	75.0	69.4	71.8	65.0	68.0	61.0
	Lowest	12.1	13.5	12.0	12.0	17 0	18.2	9.0	6.4	14.0	2.0
	Mean highest	41.5	43.9	46.6	45.7	47.8	44.5	46.1	43.9	44.7	43.9
	Mean lowest	27.3	29.1	29.3	27.5	29.9	31.4	28.0	25.1	28.3	22.7
	Monthly mean	34.4	36.5	38.0	36.6	38.8	38.0	37.1	34.5	36.5	33.3
May	Highest	79.2	79.1	79.0	80.0	88.0	74.7	82.1	82.0	82.0	76.0
	Lowest	24.1	26.0	24.0	25.0	26.0	27.2	24.0	24.0	21.0	14.0
	Mean highest	54.2	58.0	61.4	58.9	60.6	56.5	60.6	57.4	59.4	55.4
	Mean lowest	35.5	38.4	37.3	35.8	36 2	39.0	35.6	24.0	38.4	32.0
	Monthly mean	44.8	48.2	49.4	47.4	48.4	47.8	48.1	45.6	48.9	43.7
June	Highest	89.2	86.3	87.0	88.5	92.0	85.0	94.5	87.0	94.0	94.0
	Lowest	35.1	38.0	36.5	39.5	37.0	45.1	40.9	35.0	45.0	35.0
	Mean highest	71.4	72.0	73.5	72.7	74.9	72.0	76.9	74.9	78.1	77.2
	Mean lowest	49.4	52.0	51.3	50 6	52.2	54.6	51.9	49.8	56.3	50.2
	Monthly mean	60.4	62.0	62.4	61.7	63.6	63.3	64.4	62.4	67.2	63.7
July	Highest	85.9	86.2	87.0	86.5	92.0	88.8	86.6	85.0	87.0	88.0
	Lowest	38.6	37.6	35.5	39.8	43.0	49.8	41.4	39.0	48.0	38.0
	Mean highest	73.4	76.6	78.2	77.7	82.4	78.8	79.0	76.4	79.2	77.6
	Mean lowest	55.4	57.7	56.4	55.1	59.3	58.9	55.5	53.6	59.3	53.8
	Monthly mean	64.4	67.2	67.3	66.4	70.8	68.9	67.2	65.0	69.3	65.7
August	Highest	87.9	86.4	86.0	86.0	94.0	86.0	90.7	89.0	89.0	85.0
	Lowest	38.8	39.7	38.5	39.8	43.0	49.0	42.2	40.0	47.0	35.0
	Mean highest	72.8	75.0	76.4	76.2	79.8	74.3	75.8	73.1	73.8	72.9
	Mean lowest	38.8	54.1	51.8	49.9	53.2	55.5	51.0	50.5	55.1	35.0
	Monthly mean	62.8	64.6	64.1	63.1	66.5	64.9	63.4	61.8	64.5	60.5
September	Highest	81.0	83.4	84.0	82.0	89.0	81.9	84.6	81.0	81.0	80.0
	Lowest	40.1	39.3	37.5	35.0	39.0	41.3	38.7	36.0	36 0	30.0
	Mean highest	67.0	68.3	69.4	68.0	71.9	68.0	67.8	65.9	65.2	64.5
	Mean lowest	52.2	51.8	52.4	49.9	54.3	54.7	51.0	48.7	51.1	47.3
	Monthly mean	59.6	60.0	60.9	59.0	63.1	61.3	59.4	57.3	58.1	55.9
October	Highest	72.2	72.1	74.0	73.0	79.0	69.2	70.6	67.0	64.0	68.0
	Lowest	21.1	22.0	22.0	20.0	22.0	25.9	19.0	14.8	23.0	13.0
	Mean highest	52.6	52.7	55.3	53.6	57.4	52.3	52.3	50.2	50.3	48.2
	Mean lowest	37.4	37.5	34.7	33.7	36.4	37.1	32.9	31.6	35.4	30.1
	Monthly mean	45.0	45.1	45.1	43.6	46.9	44.7	42.6	40.9	42.8	39.1
November	Highest	54.0	54.1	54.0	53.5	55.0	51.1	49.6	48.0	50.0	48.0
	Lowest	18.1	9.0	15.0	16.7	19.0	21.1	11.6	11.6	14.0	1.0
	Mean highest	41.9	40.6	42.3	41.2	45.3	42.2	39.8	38.5	37.7	35.4
	Mean lowest	30.2	29.0	29.5	28.9	30.6	31.9	27.1	25.3	28.3	21.1
	Monthly mean	36.1	34.8	35.9	35.0	38.0	37.1	33.4	31.9	33.0	28.3
December	Highest	49.8	45.3	49.0	49.5	58.0	47.1	44.8	45.0	44.0	41.0
	Lowest	14.0	7.5	7.5	10.0	15.0	7.0	− 5.4	− 7.4	3.0	− 8.0
	Mean highest	35.1	32.9	34.4	33.6	37.3	34.8	31.0	30.5	28.7	28.1
	Mean lowest	24.5	23.0	22.3	21.7	25.0	24.8	17.5	15.6	17.7	11.5
	Monthly mean	29.8	28.0	28.4	27.7	31.2	29.8	24.3	23.1	23.2	19.8
Annual mean		42.2	43.4	43.9	42.5	45.5	44.2	41.5	39.2	40.8	36.7

AVERAGES OF TEMPERATURE FOR TWENTY-SIX YEARS.

TABLE II. Showing for each month the monthly average for the highest, lowest, mean highest, mean lowest, and mean temperature at the principal stations in Ontario, derived from the twenty-six years, 1882-1907, also the annual mean at each station for the same period.

Month.		Southampton.	Birnam.	London.	Woodstock.	Stoney Creek.	Toronto.	Lindsay.	Gravenhurst.	Ottawa.	Rockliffe.
		°	°	°	°	°	°	°	°	°	°
January....	Highest..........	45.0	46.7	46.7	46.4	51.6	45.2	41.9	41.8	40.4	38.0
	Lowest..........	− 7.1	− 9.2	− 9.4	−11.6	− 4.5	− 7.4	−19.8	−26.7	−21.4	−34.4
	Mean highest....	28.2	26.9	28.6	27.7	32.3	28.8	24.2	24.0	19.7	18.1
	Mean lowest	13.3	14.7	13.7	11.3	18.0	14.3	6.6	3.9	1.7	− 6.2
	Monthly mean ..	20.8	20.8	21.2	19.5	25.1	21.6	15.4	13.9	10.7	5.9
February ..	Highest..........	44.6	47.0	46.5	45.8	48.3	44.1	42.1	42.0	40.2	41.3
	Lowest..........	−11.4	−12.8	−12.0	−11.6	− 6.5	− 8.0	−18.3	−26.5	−20.9	−35.4
	Mean highest....	27.5	26.6	28.2	27.6	30.8	28.5	25.2	24.8	21.8	21.7
	Mean lowest	10.7	12.6	11.4	10.2	14.8	12.9	5.4	3.1	3.1	− 1.1
	Monthly mean ..	19.1	19.6	19.8	18.9	22.8	20.7	15.3	13.9	12.5	10.3
March	Highest..........	53.7	58.0	58.0	56.1	59.5	53.5	50.9	50.5	47.4	50.5
	Lowest..........	− 3.5	− 3.2	− 1.9	− 2.3	5.0	3.6	− 7.2	−13.6	− 8.9	−24.6
	Mean highest....	35 0	36.0	37.5	36.1	39.9	36.1	34.0	33.8	32.4	33.0
	Mean lowest	19.3	21.1	20.4	18.7	24.8	21.7	15.8	13.0	14.8	6.8
	Monthly mean ..	27.2	28.6	29.0	27.4	32.3	28.9	24.9	22·9	23.6	19.9
April	Highest..........	72.9	76.7	75.9	74.6	77.4	70.8	74.3	71.1	73.7	73.4
	Lowest..........	15.4	17.6	18.4	17.2	23.2	21.1	13.9	11.5	15.2	6.5
	Mean highest....	49.4	52.3	53.0	52.4	53.5	50.7	52.0	50.0	51.0	51.2
	Mean lowest	31.2	33.9	32.6	31.7	35.8	33.8	30.7	28.9	30.9	26.3
	Monthly mean ..	40.3	43.1	42.8	42.1	44.7	42.3	41.3	39.5	41.0	38.7
May	Highest..........	79.9	82.3	82.2	80.9	84.6	78.6	82.5	81.4	83.1	84.5
	Lowest	28 5	29.1	29.8	29.1	33.7	31.9	28.1	27 3	30.8	23 8
	Mean highest....	61.1	65.4	66.4	64.7	65.6	62.7	65.8	63.8	66.1	65.4
	Mean lowest	41.2	44.3	44.0	42.4	44.9	43.8	41.9	41.3	43.2	38.2
	Monthly mean ..	51.2	54.8	55.2	53.6	55.2	53.2	53.8	52.6	54.6	51.8
June.......	Highest..........	85.3	88.1	87.8	87.1	91.7	86.7	88.8	86.2	88.2	89.4
	Lowest..........	37.5	37.6	38.4	38.6	42.6	42.6	38.5	36.9	42.3	33.7
	Mean highest....	70.8	75.4	76.0	75.3	77.3	73.8	75.9	74.9	76.0	75.7
	Mean lowest	50.8	53.5	53.4	51.8	55.7	53.9	51.4	51.0	54.1	48.1
	Monthly mean ..	60.8	64.5	64.2	63.6	66.5	63.9	63.7	63.0	65.1	61.9
July	Highest..........	87.3	91.8	91.3	90.0	95.3	90.4	91.0	89.1	90.9	90.7
	Lowest..........	43.1	42.6	43.6	43.9	48.8	48.2	43.6	43.0	47.1	39.9
	Mean highest....	77.1	79.7	79.9	79.4	82.8	78.6	79.7	78.2	79.8	78.2
	Mean lowest	56.9	57.3	57.2	55.5	61.0	58.5	55.4	55.5	58.2	52.9
	Monthly mean ..	67.0	68.5	68.6	67.4	71.9	68.5	67.5	66.8	69.0	65.5
August	Highest..........	86.1	89.7	89.3	88.5	93.0	87.7	89.4	87.7	88.6	88.1
	Lowest..........	41.8	42.1	40.6	41.6	46.6	46.8	40.6	40.0	43.7	37.3
	Mean highest....	73.8	77.0	77.6	77.2	80.7	76.3	77.4	75.9	76.1	75.1
	Mean lowest	54.3	55.6	54.3	52.0	58.7	53.2	53.2	53.1	55.3	50.1
	Monthly mean ..	64.1	66.3	66.0	64.6	69.7	64.8	65.3	64.5	65.7	62.6
September.	Highest..........	84.4	87.0	86.0	85.7	90.3	84.3	86.0	83.7	84.4	84.4
	Lowest..........	33.9	33.7	31.8	31.3	36.7	36.6	31.5	31.4	33.2	29.1
	Mean highest....	68.3	70.7	71.2	70.3	74.0	69.2	69.5	68.7	68.3	67.6
	Mean lowest	49.8	50.8	49.6	47.4	53.1	50.9	46.9	47.1	48.0	43.6
	Monthly mean ..	59.0	60.7	60.4	58.8	63.5	60.0	58.2	57.9	58.1	55.6
October....	Highest..........	74.1	75.6	75.1	74.1	77.2	72.3	73.7	72.3	70.4	72.7
	Lowest..........	24.5	24.7	23.5	22.6	26.0	26.1	21.0	21.4	23.2	17.4
	Mean highest....	56.1	56.9	57.6	56.3	60.3	55.8	55.2	55.1	53.7	53.1
	Mean lowest	39.4	40.5	38.1	36.7	41.4	39.8	36.0	36.7	36.6	32.9
	Monthly mean ..	47.8	48.7	47.9	46.5	50.9	47.8	45.6	45.9	45.2	43.0
November..	Highest..........	60.5	62.3	61.8	61.2	65.4	59.5	58.8	58.3	56.8	55.6
	Lowest..........	13.8	12.7	12.1	11.1	16.9	14.2	5.0	7.0	6.1	− 1.0
	Mean highest....	43.2	42.6	44.0	42.7	46.9	43.4	40.4	40.4	38.3	36.8
	Mean lowest	29.9	30.6	29.2	27.7	32.3	30.6	25.8	25 9	25.4	21.6
	Monthly mean ..	36.5	36.6	36.6	35.2	39.6	37.0	33.1	33.2	31.8	29.2
December..	Highest..........	49.5	48.8	54.4	49.1	54.2	47.9	44.4	44.4	42.1	40.6
	Lowest..........	− 0.6	− 1.5	− 2.4	− 3.2	1.5	− 1.9	−13.4	−14.4	−15.9	−26.5
	Mean highest....	33.3	31.8	33.1	32.1	36.1	33.5	28.8	29.1	24.7	23.7
	Mean lowest	20.3	20.8	19.8	18.0	22.7	20.6	13.2	12.6	9.1	3.8
	Monthly mean ..	26.8	26.3	26.5	25.1	29.4	27.1	21.0	20.9	16.9	13.8
Annual mean		43.4	44.9	44.9	43.6	47.6	44.7	42.1	41.3	41.2	38.2

RAIN AND SNOW.

TABLE III.—Summary of the total fall of rain and snow, and the number of days on which rain and snow fell in Ontario, during the year 1907, at stations reporting the whole year, and the average for the Province.

Station.	Rain.		Snow.	
	Inches.	Days.	Inches.	Days.
ADDINGTON:				
Croydon	23.69	46	61.0	16
ALGOMA:				
Port Arthur	19.05	60	48.4	42
White River	17.61	64	157.0	112
Bruce Mines	23.68	90	82.6	36
Cockburn Island	21.80	77	50.1	37
BRANT:				
Paris	30.01	89	46.6	21
Brantford	26.27	58	25.7	17
BRUCE:				
Lucknow	23.50	105	112.7	74
North Bruce	19.11	85	81.6	65
Southampton	16.29	91	99.7	81
Wiarton	15.90	56	71.9	35
Point Clark	13.05	26	59.0	24
CARLETON:				
Ottawa	21.95	97	103.4	58
DUFFERIN:				
Orangeville	27.44	53	78.4	43
DURHAM:				
Port Hope	23.09	47	33.5	8
ESSEX:				
Cottam	32.17	83	41.5	31
Windsor	30.52	84	24.0	22
ELGIN:				
Port Stanley	28.07	124	47.2	50
Dutton	30.52	47	34.5	18
Port Burwell	28.63	66	31.1	27
FRONTENAC:				
Arden	25.62	94	76.0	34
Kingston	16.19	101	46.4	58
Sydenham	30.02	53	61.5	17
GREY:				
Owen Sound	21.27	78	131.7	69
Meaford	17.98	78	93.0	46
HALTON:				
Georgetown	23.86	104	60.2	57
HASTINGS:				
Madoc	22.87	82	98.7	45
HURON:				
Clinton	27.60	106	64.9	42
Goderich	16.16	54	43.5	31
KENT:				
Chatham	19.27	57	12.5	5
LAMBTON:				
Birnam	31.18	85	74.6	42
Sarnia	14.80	29	17.3	23
LANARK:				
Montague	21.02	44	39.0	19
Mac Cue	18.32	42	38.5	18
LEEDS:				
Lansdowne	20.36	37	23.0	12
Westport	18.36	46	58.4	27
MIDDLESEX:				
London	31.51	92	74.7	45
Strathroy	33.01	105	69.5	27
Westminster	21.30	49	27.5	10
MUSKOKA:				
Gravenhurst	24.39	69	110.5	58
Beatrice	25.78	77	132.5	55
Huntsville	20.72	63	85.3	46
NIPISSING:				
Lake Talon	19.45	68	42.5	32
Haileybury	24.30	97	75.2	64
NORFOLK:				
Port Dover	30.48	119	44.0	38
NORTHUMBERLAND:				
Wooler	23.74	66	48.0	17
ONTARIO:				
Uxbridge	21.17	69	64.5	33
OXFORD:				
Woodstock	28.78	85	40.2	25
Princeton	31.04	51	48.5	22
PARRY SOUND:				
Parry Sound	22.03	91	148.9	57
Uplands	12.14	67	125.0	52
Emsdale	28.16	103	85.4	44
PEEL:				
Alton	21.34	69	76.0	47
PETERBOROUGH;				
Peterborough	22.30	75	69.4	31
Otonabee	22.33	68	52.8	25
RENFREW:				
Clontarf	20.99	46	69.2	49
Rockliffe	21.05	110	78.3	102
Renfrew	19.77	83	86.0	46
SIMCOE:				
Orillia	13.71	38	112.5	33
Midland	20.14	62	99.1	36
VICTORIA:				
Lindsay	24.13	100	123.8	58
WENTWORTH:				
Stoney Creek	28.18	74	46.5	20
YORK:				
Aurora	22.03	67	59.1	33
Deer Park	23.41	66	39.5	21
Agincourt	19.00	33	37.3	22
Sutton West	22.24	74	34.0	19
Toronto	25.57	99	52.0	47
WELLAND:				
Welland	30.46	89	35.8	21
Average for the Province: 1907	23.18	73	66.6	38
1906	27.06	76	52.4	32
1905	24.90	78	64.3	39
1904	25.60	77	75.0	43
1903	26.44	78	69.8	40
1902	28.29	97	54.8	32
1901	24.12	79	76.3	43
1900	25.28	81	64.6	34
1899	25.13	87	60.5	54
1898	24.90	81	74.2	44
1897	28.30	88	73.0	49
1896	22.36	82	73.4	43
1882-07	24.51	86	73.3	40

RAIN AND SNOW.

TABLE IV.—Monthly summary of inches of rain and snow in precipitation in the several districts of Ontario in 1907; also the average derived from the twenty-six years 1882-1907.

Districts.		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total for year.
West and Southwest:		in.	in.	in.	in.	in.	in.	in.	in.	In.	in.	in.	in.	in.
Rain.	1907	2.66	0.11	1.92	1.70	2.35	2.84	2.60	1.02	4.24	2.67	2.44	3.11	27.66
	1882-1907	1.15	1.22	1.38	1.82	3.17	3.08	2.96	2.54	2.64	2.77	2.28	1.62	26.63
Snow	1907	9.4	7.9	5.1	0.5	1.4	......	......	......	......	S	2.4	10.7	37.4
	1882-1907	15.1	12.3	8.6	2.5	0.1	......	.....	......	......	0.6	5.4	11.9	56.5
Northwest and North:														
Rain.	1907	1.22	0.06	1.72	1.68	1.45	2.38	1.94	1.73	3.01	2.32	2.05	0.67	20.23
	1882-1907	0.78	0.51	1.02	1.43	2.65	2.87	2.90	2.79	3.09	3.02	1.88	0.98	23.92
Snow	1907	18.3	15.0	8.1	6.9	3.0	......	......	......	......	0.2	9.4	21.4	82.3
	1882-1907	25.9	20.0	13.0	3.5	0.4	......	......	......	......	1.4	12.4	21.7	98.3
Centre:														
Rain.	1907	2.42	0.10	1.71	2.07	1.97	2.25	2.12	1.04	3.73	2.23	2.73	2.25	24.62
	1882-1907	1.10	0.98	1.33	1.73	2.78	2.90	2.81	2.43	2.38	2.52	2.00	1.41	24.37
Snow	1907	9.1	7.2	4.2	2.9	2.9	......	......	......	......	0.0	1.8	22.9	51.0
	1882-1907	17.6	14.2	9.5	3.0	0.2	......	......	......	......	0.6	5.2	11.8	62.1
East and Northeast:														
Rain.	1907	1.38	0.09	1.15	1.67	1.32	1.56	2.03	1.45	4.05	2.73	3.35	1.77	22.55
	1882-1907	0.87	0.65	1.16	1.48	2.58	2.94	2.96	2.56	2.58	2.34	1.83	1.20	23.15
Snow	1907	9.1	11.7	3.0	5.5	3.9	......	......	......	......	0.0	3.5	18.2	54.9
	1882-1907	20.5	17.1	10.7	3.2	0.2	......	......	......	......	0.9	7.3	14.7	74.6
The Province:														
Rain.	1907	1.92	0.09	1.62	1.78	1.77	2.26	2.17	1.31	3.76	2.49	2.64	1.95	23.76
	1882-1907	0.97	0.84	1.22	1.61	2.79	2.95	2.91	2.58	2.67	2.66	2.00	1.30	24.50
Snow	1907	11.5	10.5	5.1	3.9	2.8	......	......	......	......	0.1	4.3	18.3	56.5
	1882-1907	19.8	15.9	10.5	3.1	0.2	......	......	......	......	0.9	7.6	15.0	73.0

SUNSHINE.

TABLE V.—Monthly summary of bright sunshine at the principal stations in Ontario in 1907, showing the number of hours the sun was above the horizon, the hours of registered sunshine, the total for the year, and the average derived from the twenty-six years 1882-1907.

Stations.		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
		hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.
Sun above horizon		285.7	291.4	369.9	406.4	461.1	465.7	470.9	434.5	376.3	340.2	286.9	274.3	4463.3
Woodstock	1907	60.3	98.1	93.5	140.3	210.6	232.2	283.2	268.1	117.6	137.0	51.3	49.7	1741.9
	1882-1907	62.0	89.6	122.7	174.7	207.8	242.7	272.4	237.8	175.2	146.7	71.7	53.9	1857.2
Toronto	1907	71.7	116.8	121.0	158.0	223.7	234.6	270.7	261.3	165.1	177.6	78.4	42.1	1921.6
	1882-1907	79.0	108.4	149.3	192.9	221.2	255.7	280.1	251.9	209.7	148.8	82.9	63.5	2043.4
Lindsay	1907	54.1	97.0	86.8	186.1	270.8	182.3	226.3	163.4	182.9	147.1	110.5	46.8	1754.1
	1882-1907	73.5	104.8	151.0	196.0	216.0	241.3	258.6	239.6	196.7	136.6	72.7	56.7	1943.5
Kingston	1907	60.4	128.1	145 0	161.0	226.9	254.0	269.1	265.1	126.0	163.7	65.6	51.6	1916.5
	1882-1907	76.9	110.4	152.3	188.4	201.8	246.3	267.1	245.0	191.8	138.6	78.6	67.7	1964.9
Ottawa	1907	66.5	116.2	149.5	175.8	207.1	205.2	235.7	243.3	121.6	136.3	65.3	48.9	1771.4
	1882-1907	82.3	104.8	142.0	184.8	223.5	220.8	242.8	23[illegible].6	164.8	125.6	86.0	56.1	1870.1
Average of five stations	1907	62 6	111.2	119.2	164.2	227.8	221.7	257.0	240.2	142.6	152.3	74.2	47.8	1820.8
	1906	88.6	135.4	133.0	201.6	218·6	228.8	270.3	255.7	237.7	125.1	84.2	65.6	2044.6
	1882-1907	74.7	103.6	143.4	187.4	217.9	241.3	264.2	242.1	187.6	139.2	78.3	60.0	1939.7

RURAL AREAS ASSESSED.

TABLE VI.—Showing by County Municipalities the rural area of Ontario as returned by Municipal assessors for 1907; also the comparative totals for the Province for the ten years 1898-1907.

Counties and Districts.	Acres of assessed land.	Acres cleared.	Acres of woodland.	Acres of slash land.	Acres, swamp, marsh, or waste land.	Per cent. cleared.
Algoma	475,251	57,806	338,046	20,664	58,735	12.16
Brant	216,177	177,262	12,870	13,081	12,964	82.00
Bruce	921,078	555,474	130,842	97,178	137,584	60.31
Carleton	563,966	345,357	57,699	99,415	61,495	61.24
Dufferin	356,673	255,757	28,881	29,493	42,542	71.71
Dundas	237,057	158,587	47,260	20,273	10,937	66.90
Durham	370,745	298,028	35,517	6,443	30,757	80.39
Elgin	437,183	346,561	61,713	23,251	5,658	79.27
Essex	427,056	321,899	50,734	46,479	7,944	75.38
Frontenac	694,672	298,728	131,137	147,740	117,067	43.00
Glengarry	287,817	195,517	56,126	11,739	24,435	67.93
Grenville	272,461	181,229	35,506	22,190	33,536	66.52
Grey	1,065,571	689,635	135,481	62,486	177,969	64.72
Haldimand	280,038	234,263	35,247	7,363	3,165	83.65
Haliburton	581,094	40,847	314,741	31,257	194,249	7.03
Halton	223,469	172,067	29,278	16,751	5,373	77.00
Hastings	1,067,627	431,912	344,491	123,049	168,175	40.46
Huron	798,146	648,063	61,752	25,813	62,518	81.20
Kent	568,448	463,107	50,269	36,944	18,128	81.47
Lambton	656,893	466,288	66,241	103,922	20,442	70.98
Lanark	683,552	321,500	202,045	32,116	127,891	47.03
Leeds	468,509	266,834	98,844	36,338	66,493	56.95
Lennox and Add	443,886	268,396	96,858	21,219	57,413	60.47
Lincoln	190,339	159,189	21,084	8,288	1,778	83.63
Manitoulin	264,757	44,731	70.595	95,997	53,434	16.90
Middlesex	757,654	652,821	83,926	11,317	9,590	86.16
Muskoka	556,377	63,959	367,599	25,097	99,722	11.50
Nipissing	558,898	51,631	412,453	16,345	78,469	9.24
Norfolk	398,686	270,844	70,402	29,298	28,142	67.93
Northumberland	435,597	340,770	39,758	18,593	36,476	78.23
Ontario	504,196	366,531	29.127	45,738	62,800	72.70
Oxford	471,733	393,775	37,285	21,148	19,525	83.47
Parry Sound	599,015	75,081	396,333	32,948	94,653	12.53
Peel	288,547	258,558	12,026	6,423	11,540	89.61
Perth	518,402	446,637	35,979	20,332	15,454	86.16
Peterborough	574,499	259,688	130,778	88,315	95,718	45.20
Prescott	291,604	202,265	28,890	44,312	16,137	69.36
Prince Edward	233,418	193,116	20,842	3,895	15,565	82.73
Rainy River	274,654	20,930	195,167	26,225	32,332	7.62
Renfrew	1,026,998	349,871	393,758	96,924	186,445	34.07
Russell	250,667	124,332	51,536	72,245	2,554	49.60
Simcoe	969,427	633,265	127,766	146,589	61,807	65.32
Stormont	247,151	146,285	49,607	35,827	15,432	59.19
Thunder Bay	312,039	8,859	215,025	22,000	66,155	2.84
Victoria	599.608	283,809	59,650	114,361	141,788	47.33
Waterloo	306,782	252,591	31,750	5,183	17,258	82.34
Welland	227,421	181,932	23.579	12,506	9,404	80.00
Wellington	628,472	490,837	40,046	14,960	82,629	78.10
Wentworth	270,750	211,882	18,207	13,066	27,595	78.26
York	537,059	437,168	37,904	17,455	44.532	81.40
The Province:						
1907	24,392,119	14,116.474	5,422,650	2,080,591	2,772,404	57.87
1906	24,284,730	14,107.015	5,449,125	1,963,350	2,765,240	58.09
1905	24,184,540	13,931,437	5,594,673	1,811,992	2,846,438	57.60
1904	24,138,846	13,809,368	6,670,902	....	3,658,576	57.21
1903	23,930,512	13,643,069	6,719,720	....	3,567,723	57.01
1902	23,727,010	13,570,229	6,684,512	....	3,472,269	57.19
1901	23,636,178	13,436,482	6,715,872	....	3,483,824	56.85
1900	23,568,104	13,297,206	7,127,363	....	3,143,535	56.42
1899	23,451,092	13,111,292	7,149,404	....	3,190,396	55.91
1898	23,392,584	12,993,614	7,198,905	....	3,200,065	55.55

FALL WHEAT AND SPRING WHEAT.

TABLE VII.—Showing by County Municipalities of Ontario, the area, produce and market value of the crops of Fall Wheat and Spring Wheat for the year 1907, together with the totals for the Province for the past ten years and the average for the twenty-six years, 1882-1907; also the average yield per acre.

Counties and Districts.	Fall Wheat.				Spring Wheat.			
	Acres.	Bushels.	Per acre.	Market value.	Acres.	Bushels.	Per acre.	Market value.
Algoma	215	5,698	26.5	$ 5,282	446	7,314	16.4	$ 6,319
Brant	22,218	513,236	23.1	475,770	110	1,672	15.2	1,445
Bruce	32,620	929,670	28.5	861,804	1,511	25,687	17.0	22,194
Carleton	96	1,920	20.0	1,780	5,617	108,970	19.4	94,150
Dufferin	4,580	100,302	21.9	92,980	2,452	43,646	17.8	37,710
Dundas	108	2,128	19.7	1,973	253	4,149	16.4	3,585
Durham	5,092	101,840	20.0	94,406	9,883	161,093	16.3	139,184
Elgin	28,666	647,852	22.6	600,559	352	7,040	20.0	6,083
Essex	11,234	224,680	20.0	208.278	733	12,314	16.8	10,639
Frontenac	676	16,697	24.7	15,478	3,980	62,884	15.8	54,332
Glengarry	....	....	......	....	3,086	58,696	17.4	46,393
Grenville	31	419	13.5	388	428	8,646	20.2	7,470
Grey	24,689	701,168	28.4	649,983	4,174	74,297	17.8	64,193
Haldimand	31,449	619,545	19.7	574,318	194	3,046	15.7	2,632
Haliburton	....	....	......	....	239	4,183	17.5	3,614
Halton	18,833	393,610	20.9	364,876	838	13,659	16.3	11,801
Hastings	2,407	37,309	15.5	34,585	2,402	37,711	15.7	32,582
Huron	34,684	926,063	26.7	858,461	2,032	38,608	19.0	33,357
Kent	43,224	976,862	22.6	905,551	1,005	16.583	16.5	14,328
Lambton	26,144	499,350	19.1	462,897	237	3,697	15.6	3,194
Lanark	663	10,144	15.3	9,403	6,217	82,686	13.3	71,441
Leeds	789	13,808	17.5	12,800	1,671	24,898	14.9	21,512
Lennox and Add.	1,128	16,356	14.5	15,162	2,971	43,971	14.8	37,991
Lincoln	14,105	235,554	16.7	218,359	176	3,221	18.3	2,783
Manitoulin	350	6,055	17.3	5.613	999	17,183	17.2	14,846
Middlesex	46,548	1,093,878	23.5	1,014,025	236	4,673	19.8	4,037
Muskoka	14	280	20.0	260	335	5,193	15.5	4,487
Nipissing	73	1,599	21.9	1,482	542	9,648	17.8	8,336
Norfolk	31,729	599,678	18.9	555,902	64	960	15.0	829
Northumberl'd.	7,943	148,534	18.7	137,691	4,420	65,416	14.8	56,519
Ontario	10,787	259,967	24.1	240,989	11,608	221,713	19.1	191,560
Oxford	26,996	734,291	27.2	680,688	109	1,853	17.0	1,601
Parry Sound	....	....	.....	....	440	7,128	16.2	6,159
Peel	16,841	330,084	19.6	305.988	1,356	24,137	17.8	20,854
Perth	33,179	925,694	27.9	858,118	726	14,375	19.8	12,420
Peterborough	9,819	219,946	22.4	203,890	2,444	43,748	17.9	37,798
Prescott	116	1,740	15.0	1,613	4,369	78.642	18.0	67,947
Prince Edward	1,655	25,653	15.5	23,780	956	12,237	12.8	10,573
Rainy River	111	2,353	21.2	2,181	361	8,664	24.0	7,486
Renfrew	64	1,293	20.2	1,199	33,863	562,126	16.6	485,677
Russell	37	740	20.0	686	1,871	31,620	16.9	27,320
Simcoe	63,478	1,371,125	21.6	1,271,033	6,121	103,445	16 9	89.377
Stormont	24	480	20.0	445	591	10,047	17 0	8,681
Thunder Bay	1	15	15.0	14	17	255	15.0	220
Victoria	5,868	132,030	22.5	122,392	7,332	113,646	15.5	98,190
Waterloo	29,891	765,210	25.6	709,350	228	4,286	18.8	3,703
Welland	20,649	334,514	16.2	310,094	135	1,823	13.5	1,575
Wellington	10,578	283,490	26.8	262,795	5,531	111,173	20.1	96.053
Wentworth	24,421	539,704	22.1	500,306	315	5,229	16.6	4,518
York	31,341	792,927	25 3	735,043	8,538	170,760	20.0	147,536
The Province:								
1907	676,164	15,545,491	23.0	14,410,670	144,514	2,473,651	17.1	2,137,234
1906	787,287	18,841,774	23.9	13,321,134	171,745	3,267,000	19.0	2,250,963
1905	796,213	17,933,961	22.5	13,719,480	190,116	3,582,627	18 8	2,683.387
1904	605,458	9,160,623	15.1	9,041,535	225,027	3,471,103	15.4	3,269.779
1903	665,028	17,242,763	25 9	12,949,315	248,518	4,650,707	18.7	3,460,126
1902	748,592	20,233,669	27.0	14,305,204	303,115	6,048,024	20.0	4,209.425
1901	911,587	15,943,229	17.5	10,538,474	358,048	5,498,751	15.4	3,673,166
1900	1,068,640	23,369,737	21.9	15,517,505	376,905	6,940,333	18 4	4,684.725
1899	1,049,691	14,439,827	13.3	9,631,365	398,726	7,041,317	17.7	4,682,476
1898	1,048,182	25,158,713	24.0	17,460,147	389,205	6,873,785	17.7	3,756.659
1882–1907	869,813	17,932,068	20.6	14,106,042	403,156	6,399.290	15.9	5,158,168

BARLEY AND OATS.

TABLE VIII.—Showing by County Municipalities of Ontario, the area, produce and market value of the crops of Barley and Oats for the year 1907, together with the totals for the Province for the past ten years and the average for the twenty-six years, 1882-1907 ; also the average yield per acre.

Counties and Districts.	Barley.				Oats.			
	Acres.	Bushels.	Per acre.	Market value.	Acres.	Bushels.	Per acre.	Market value.
Algoma	1,434	32,552	22.7	$ 19,336	11,626	245,309	21.1	$ 119,711
Brant	10,845	312,336	28.8	185,528	28,125	798,750	28.4	389,790
Bruce	21,000	573,300	27.3	340,540	110,639	2,898,742	26.2	1,414,586
Carleton......	8,364	228,337	27.3	135,632	101,029	3,212,722	31.8	1,567,808
Dufferin	23,069	662,080	28.7	393,276	69,459	2,055,986	29.6	1,003,321
Dundas.......	3,468	103,693	29.9	61,594	34,860	1,115,520	32.0	544,374
Durham	23,901	630,986	26.4	374,806	59,925	1,821,720	30.4	888,999
Elgin	12,605	351,680	27.9	208,898	51,106	1,221,433	23.9	596,059
Essex	10,406	309,058	29.7	183,580	81,623	2,163,010	26.5	1,055,549
Frontenac	9,095	186,448	20.5	110,750	55,617	1,301,438	23.4	635,102
Glengarry	6,220	174,160	28.0	103,451	45,180	1,373,472	30.4	670,254
Grenville	2,550	58,395	22.9	34,687	36,328	999,020	27.5	487,522
Grey	35,872	972,131	27.1	577,446	151,293	3,963,877	26.2	1,934,372
Haldimand....	9,004	227,801	25.3	135,314	40,549	1,147,537	28.3	559,998
Haliburton ...	654	17,266	26.4	10,256	7,113	168,578	23.7	82,266
Halton	12,120	352,692	29.1	209,499	29,251	971,133	33.2	473,913
Hastings	28,289	636,503	22.5	378,083	86,180	2,137,264	24.8	1,042,985
Huron	32,415	985,416	30.4	585,337	137,072	3,796,894	27.7	1,852,884
Kent	34,276	1,038,563	30.3	616,906	81,353	2,277,884	28.0	1,111,607
Lambton	28,989	782,703	27.0	464,926	100,616	2,465,092	24.5	1,202,965
Lanark	6,728	137,924	20.5	81,927	47,110	1,064,686	22.6	519,567
Leeds	5,027	125,172	24.9	74,352	47,735	1,331,807	27.9	649,922
Lennox & Add.	10,960	203,856	18.6	121,090	48,892	1,095,181	22.4	534,448
Lincoln	3,938	95,300	24.2	56,608	27,661	816,000	29.5	398,208
Manitoulin ...	1,483	25,359	17.1	15,063	7,045	88,767	12.6	43,318
Middlesex	24,933	777,910	31.2	462,078	114,075	3,319,583	29.1	1,619,957
Muskoka......	775	14,493	18.7	8,609	12,725	288,858	22.7	140,963
Nipissing	809	23,137	28.6	13,743	9,894	269,117	27.2	131,329
Norfolk.......	7,372	187,986	25.5	111,664	42,484	1,045,106	24.6	510,012
Northumberl'd	22,052	542,479	24.6	322,233	64,251	1,850,429	28.8	903,009
Ontario	30,792	957,631	31.1	568,833	79,138	2,635,295	33.3	1,286,024
Oxford	20,771	658,441	31.7	391,114	84,576	2,647,229	31.3	1,291,848
Parry Sound..	1,155	25,410	22.0	15,094	15,681	330,869	21.1	161,464
Peel..........	33,186	975,668	29.4	579,547	56,110	1,890,907	33.7	922,763
Perth.........	29,909	1,004,942	33.6	596,936	105,689	3,001,568	28.4	1,464,765
Peterborough..	12,148	332,855	27.4	197,716	62,471	1,899,118	30.4	926,770
Prescott	6,425	205,600	32.0	122,126	54,102	1,498,625	27.7	731,329
Prince Edward	15,855	294,903	18.6	175,172	28,432	670,995	23.6	327,446
Rainy River..	660	21,120	32.0	12,545	3,362	133,135	39.6	64,970
Renfrew......	5,488	143,237	26.1	85,083	69,738	1,868,978	26.8	912,061
Russell........	3,789	114,049	30.1	67,745	34,564	1,109,504	32.1	541,438
Simcoe	67,512	1,910,590	28.3	1,134,890	138,791	4,011,060	28.9	1,957,397
Stormont......	4,207	122,424	29.1	72,720	30,872	1,102,130	35.7	537,839
Thunder Bay.	238	7,140	30.0	4,241	1,434	43,020	30.0	20,994
Victoria	20,164	566,608	28.1	336,565	76,549	2,204,611	28.8	1,075,850
Waterloo......	17,920	562,688	31.4	334,236	58,651	1,865,102	31.8	910,170
Welland......	2,988	58,565	19.6	34,788	30,028	765,714	25.5	373,668
Wellington ...	34,140	1,082,238	31.7	642,849	114,706	3,429,709	29.9	1,673,698
Wentworth ...	11,927	332,763	27.9	197,661	42,101	1,279,870	30.4	624,577
York.........	48,964	1,571,744	32.1	933,616	104,698	3,831,947	36.6	1,869,990
The Province:								
1907......	766,891	21,718,332	28.3	12,900,689	2,932,509	83,524,301	28.5	40,759,859
1906......	756,163	25,253,011	33.4	11,363,855	2,716,711	108,341,455	39.9	36,836,095
1905......	772,633	24,265,394	31.4	10,409,854	2,668,416	105,563,572	39.6	35,469,360
1904......	772,434	24,567,825	31.8	10,736,140	2,654,936	102,173,443	38.5	33,002,022
1903......	709,839	24,378,817	34.3	10,263,482	2,638,665	109,874,053	41.6	32,193,097
1902......	661,622	21,890,602	33.1	9,872,661	2,500,758	106,431,439	42.6	37,038,141
1901......	637,201	16,761,076	26.3	7,542,484	2,408,464	78,334,490	32.5	28,357,085
1900......	577,810	16,909,751	29.3	6,577,893	2,398,834	89,693,327	37.4	23,768,732
1899......	490,374	14,830,891	30.2	5,858,202	2,363,778	89,897,724	38.0	24,901,670
1898......	438,784	12,663,668	28.9	4,812,194	2,376,360	86,858,293	36.6	22,409,440
1882–1907.	648,514	17,945,220	27.7	8,515,040	2,140,887	76,627,266	35.8	24,871,923

PEAS AND BEANS.

TABLE IX.—Showing by County Municipalities of Ontario, the area, produce and market value of the crops of Peas and Beans for the year 1907, together with the totals for the Province for the past ten years and the average for the twenty-six years, 1882-1907 ; also the average yield per acre.

Counties and Districts.	Peas.				Beans.			
	Acres.	Bushels.	Per acre.	Market value.	Acres.	Bushels.	Per acre.	Market value.
Algoma	2,390	54,492	22.8	$ 42,504	39	585	15.0	$ 889
Brant	2,693	49,282	18.3	38,440	368	6,661	18.1	10,125
Bruce	30,624	713,539	23.3	556,560	201	3,216	16.0	4,888
Carleton	1,926	42,950	22.3	33,501	394	7,880	20.0	11,977
Dufferin	6,170	137,591	22.3	107,321	37	555	15.0	844
Dundas	291	6,518	22.4	5,084	106	2,184	20.6	3,320
Durham	18,420	412,608	22.4	321,834	557	9,692	17.4	14,732
Elgin...........	6,323	127,092	20.1	99,132	9,017	173,126	19.2	263,152
Essex	3,157	71,348	22.6	55,651	426	8,222	19.3	12,497
Frontenac	1,843	34,280	18.6	26,738	318	6,360	20.0	9,667
Glengarry	486	8,456	17.4	6,596	159	2,783	17.5	4,230
Grenville	185	3,700	20.0	2,886	156	2,340	15.0	3,557
Grey	27,085	625,664	23.1	488,018	289	6.069	21.0	9,225
Haldimand	8,996	177,221	19.7	138,232	299	4,963	16.6	7,544
Haliburton	633	11,774	18.6	9,184	24	360	15.0	547
Halton	5,821	128,062	22.0	99,888	49	735	15.0	1,117
Hastings	6,566	116,875	17.8	91,163	456	7,889	17.3	11,991
Huron	22,229	542,388	24.4	423,063	248	4,935	19.9	7,501
Kent...........	4,426	87,635	19.8	68,355	23,935	373,386	15.6	567,547
Lambton	3,978	77,571	19.5	60,505	1,328	21,514	16.2	32,701
Lanark	2,075	32,578	15.7	25,411	274	2,740	10.0	4,165
Leeds	635	12,954	20.4	10,104	219	4,008	18.3	6,092
Lennox & Add..	4,658	74,994	16.1	58,495	286	3,975	13.9	6,042
Lincoln.........	3,039	57,741	19.0	45,038	339	5,560	16.4	8,451
Manitoulin	3,847	90,405	23.5	70,516	23	345	15.0	524
Middlesex	6,842	162,155	23.7	126,481	1,079	19,530	18.1	29,686
Muskoka	1,199	23,021	19.2	17,956	66	990	15.0	1,505
Nipissing	1,991	53,558	26.9	41,775	24	360	15.0	547
Norfolk	7,624	131,895	17.3	102,878	839	14,515	17.3	22,063
Northumberl'd .	15,190	315,952	20.8	246,443	931	15,455	16.6	23,492
Ontario	12,110	278.530	23.0	217,253	216	3,780	17.5	5,746
Oxford	4,801	116,664	24.3	90,998	221	3,647	16.5	5,543
Parry Sound....	2,562	54,314	21.2	42,365	88	1,690	19.2	2,569
Peel	7,477	157,765	21.1	123,057	236	3,894	16.5	5,919
Perth	11,103	274,244	24.7	213,910	81	1,377	17.0	2,093
Peterborough ..	12,988	281,840	21.7	219,835	93	1,302	14.0	1,979
Prescott	1,126	20,493	18.2	15,985	321	5,136	16.0	7,807
Prince Edward .	7,901	115,355	14.6	89,977	712	11,178	15.7	16,991
Rainy River	41	914	22.3	713	9	135	15.0	205
Renfrew........	15,359	310,252	20.2	241,997	449	6,062	13.5	9,214
Russell	859	16,665	19.4	12,999	172	2,700	15.7	4,104
Simcoe	19,979	399,580	20.0	311,672	276	4,057	14.7	6,167
Stormont	379	7,428	19.6	5,794	150	3,600	24.0	5,472
Thunder Bay ...	66	1,320	20.0	1,030	4	60	15.0	91
Victoria	8,955	172,832	19.3	134,809	306	4,590	15.0	6.977
Waterloo	5,925	130,943	22.1	102,136	18	270	15.0	410
Welland........	2,299	41,382	18.0	32,278	1,248	17,347	13.9	26.367
Wellington	10,929	262.296	24.0	204,591	120	2,400	20.0	3.648
Wentworth	4,044	82,498	20.4	64,348	115	1,725	15.0	2.622
York	10,732	255,422	23.8	199,229	241	4,386	18.2	6.667
The Province .								
1907........	340,977	7,365,036	21.6	5,744,728	47,562	790,269	16.6	1,201.209
1906........	410,356	7,388,987	18.0	5,216,625	51,272	950,312	18.5	1,320,934
1905........	374,518	7,100,021	19.0	4,636,314	50,543	846,443	16.7	1,117.305
1904........	339,260	6,629,866	19.5	4,176,816	50,892	912,849	17.9	1.113.676
1903........	407,133	8,924,650	21.9	5,738,550	53,039	978,246	18.4	1,379.327
1902........	532,639	7,664,679	14.4	5,441,922	53.964	670,633	12.4	905.355
1901........	602.724	10,039,173	16.7	6,588,230	53,688	824.122	15.4	1,030,153
1900........	661.592	14,058,198	21.2	8,027,231	44,053	820.373	18.6	817.912
1899........	743,139	15,140,790	20.4	8,675,673	40,485	651,009	16.1	703.090
1898........	865,951	13,521.263	15.6	7,058,099	45,220	759,657	16.8	531,760
1882–1907...	645,873	12,560,917	19.6	7,416,337	41,762	715,333	17.1	795.096

RYE AND BUCKWHEAT.

TABLE X.—Showing by County Municipalities of Ontario, the area, produce, and market value of the crops of Rye and Buckwheat for the year 1907, together with the totals for the Province for the past ten years, and the average for the twenty-six years 1882-1907, also the average yield per acre.

Counties and Districts.	Rye.				Buckwheat.			
	Acres.	Bushels.	Per acre.	Market value.	Acres.	Bushels.	Per acre.	Market value.
Algoma	79	1,098	13.9	$ 762	29	516	17.8	$ 296
Brant	3,891	62,645	16.1	43,476	1,663	35,422	21.3	20,332
Bruce	413	7,806	18.9	5,417	1,302	24,087	18.5	13,826
Carleton	197	3,093	15.7	2,147	2,064	36,533	17.7	20,970
Dufferin	1,950	33,930	17.4	23,548	2,599	50,421	19.4	28,942
Dundas	432	9,202	21.3	6,386	1,091	23,893	21.9	13,715
Durham	7,558	115,637	15.3	80,252	6,724	185,582	27.6	106,524
Elgin	3,395	61,450	18.1	42,646	2,481	60,288	24.3	34,605
Essex	1,037	21,051	20.3	14,609	1,319	28,886	21.9	16,581
Frontenac	763	11,369	14.9	7,890	1,389	31,253	22.5	17,939
Glengarry	16	240	15.0	167	982	22,684	23.1	13,021
Grenville	403	6,085	15.1	4,223	2,786	61,292	22.0	35,182
Grey	138	2,525	18.3	1,752	2,506	54,631	21.8	31,358
Haldimand	699	10,555	15.1	7,325	1,284	28,248	22.0	16,214
Haliburton	57	969	17.0	672	418	9,405	22.5	5,398
Halton	97	1,494	15.4	1,037	217	3,038	14.0	1,744
Hastings	3,006	43,286	14.4	30,041	4,040	93,324	23.1	53,568
Huron	203	3,999	19.7	2,775	1,676	32,179	19.2	18,471
Kent	732	14,786	20.2	10,262	1,871	31,807	17.0	18,257
Lambton	336	6,720	20.0	4,664	552	9,660	17.5	5,545
Lanark	377	6,032	16.0	4,186	2,629	51,791	19.7	29,728
Leeds	321	5,585	17.4	3,876	2,224	56,934	25.6	32,680
Lennox & Add	1,384	16,470	11.9	11,430	4,136	99,264	24.0	56,978
Lincoln	652	10,693	16.4	7,421	570	12,141	21.3	6,969
Manitoulin	87	1,192	13.7	827	28	280	10.0	161
Middlesex	742	12,540	16.9	8,703	507	8.923	17.6	5,122
Muskoka	9	144	16.0	100	84	1,680	20.0	964
Nipissing	57	1,140	20.0	791	59	1,180	20.0	677
Norfolk	11,672	161,074	13.8	111,785	10,297	207,999	20.2	119,392
Northumberl'd	7,112	94,590	13.3	65,645	7,556	200,234	26.5	114,934
Ontario	3,261	53,807	16.5	37,342	8,169	187,887	23.0	107,847
Oxford	1,346	23,824	17.7	16,534	1,516	27,743	18.3	15,924
Parry Sound	49	809	16.5	561	86	1,720	20.0	987
Peel	911	14,667	16.1	10,179	1,080	26,784	24.8	15,374
Perth	48	480	10.0	333	383	8,809	23.0	5,056
Peterborough	1,377	22,583	16.4	15,673	3,232	81,446	25.2	46,750
Prescott	......	......	......	......	945	25,799	27.3	14,809
Prince Edward	2,671	35,257	13.2	24,468	3,820	67,614	17.7	38,811
Rainy River	12	180	15.0	125	4	80	20.0	46
Renfrew	1.735	26,719	15.4	18,543	1,284	26,964	21.0	15,477
Russell	......	......	......	......	617	14,376	23.3	8,252
Simcoe	3,214	49,817	15.5	34,573	6,034	118,870	19.7	68,231
Stormont	103	1,978	19.2	1,373	1,659	43,134	26.0	24,759
Thunder Bay	21	315	15.0	219	......	......	......	......
Victoria	909	17,089	18.8	11,860	8,043	194,641	24.2	111,724
Waterloo	510	9,180	18.0	6,371	298	5,960	20.0	3,421
Welland	378	5,935	15.7	4,119	3,143	71,660	22.8	41,133
Wellington	433	9,526	22.0	6,611	3,327	81.512	24.5	46,788
Wentworth	983	16,514	16.8	11,461	1,487	26,320	17.7	15,108
York	1,382	22,941	16.6	15,921	2,829	71,574	25.3	41,083
The Province								
1907	67,158	1,039,021	15.5	721,081	113,039	2,546,468	22.5	1,461,673
1906	79,870	1,327,582	16.6	808,497	106,444	1,792,903	16.8	887,487
1905	101,292	1,714,951	16.9	974,092	101,591	2,199,652	21.7	1,099,826
1904	130,702	2,001,826	15.3	1,153,052	100,608	2,066,234	20.5	1,004,190
1903	179,277	2,970,768	16.6	1,443,793	95,487	2,049,169	21.5	907,782
1902	189,318	3,509,332	18.5	1,772,213	93,324	1,911,683	20.5	917,608
1901	158,236	2,545,268	16.1	1,254,817	88,266	1,757,071	19.9	850,422
1900	142,213	2,357,635	16.6	1,143,453	102,570	1,874,261	18.3	819,052
1899	137,824	2,284,846	16.6	1,142,423	132,082	2,203.299	16.7	1,002,501
1898	165,089	2,673,234	16.2	1,162,857	150,394	2,373,645	15.8	906,732
1882-1907	118,301	1,933,979	16.3	1,013,544	100,494	1,969,577	19.6	832,122

CORN.*

TABLE XI.—Showing by County Municipalities of Ontario, the area, produce, and market value of the crops of Corn for husking and for fodder for the year 1907 together with the totals for the Province for the past ten years and the average for the sixteen years, 1892-1907, also the averages per acre.

Counties and Districts.	Corn for husking.				Corn for Silo.			
	Acres.	Bushels.	Per acre	Market value.	Acres.	Tons (green).	Per acre.	Market value.
				$				$
Algoma	38	1,520	40.0	432	17	136	8.00	272
Brant	5,166	350,771	67.9	99,619	3,817	37,330	9.78	74,660
Bruce	841	43,480	51.7	12,348	4,135	37,050	8.96	74.100
Carleton	1,177	58,850	50.0	16,713	9,432	118,843	12.60	237,686
Dufferin	126	6,300	50.0	1,789	289	2,890	10.00	5,780
Dundas	3,727	219,148	58.8	62,238	7,295	94,835	13.00	189,670
Durham	1,667	74,015	44.4	21,020	3,107	30,759	9.90	61,518
Elgin	25,741	1,830,185	71.1	519,772	6,195	50,613	8.17	101,226
Essex	87,350	5,887,390	67.4	1,672,019	3,119	13,443	4.31	26,886
Frontenac	2,414	124,562	51.6	35,376	4,974	39,792	8.00	79,584
Glengarry	1,295	58,275	45.0	16,550	3,963	48,864	12.33	97,728
Grenville	4,107	217,671	53.0	61,818	4,438	49,306	11.11	98,612
Grey	375	22.500	60.0	6,390	4,659	47,429	10.18	94,858
Haldimand	3,381	229,908	68.0	65,294	2,289	19,502	8.52	39,004
Haliburton	135	6,075	45 0	1,725	62	496	8.00	992
Halton	507	34,070	67.2	9,676	3,165	38,423	12.14	76,846
Hastings	6,190	304,548	49 2	86,492	8,220	81,214	9.88	162 428
Huron	1,695	94,581	55.8	26,861	7,311	91,314	12.49	182,628
Kent	74,162	5,065,265	68.3	1,438,535	5,413	31,558	5.83	63,116
Lambton	24,002	1,610,534	67.1	457,392	6,200	48,174	7.77	96,348
Lanark	1,465	87,900	60.0	24,964	5,947	62,444	10.50	124,888
Leeds	6,057	292,553	48.3	83,085	6,381	70,191	11.00	140,382
Lennox & Addington	2,785	156,239	56.1	44,372	2,665	19,428	7.29	38,856
Lincoln	6,124	334,983	54.7	95,135	2,081	15,316	7.36	30,632
Manitouiin	132	5,056	38.3	1,436	258	2,727	10.57	5,454
Middlesex	17,841	1,186,427	66.5	336,945	13,336	128,292	9.62	256,584
Muskoka	289	13,381	46.3	3,800	351	4,563	13.00	9,126
Nipissing	151	7,550	50.0	2,144	90	450	5.00	900
Norfolk	16,856	1,053,500	62.5	299,194	5,044	44,034	8.73	88,068
Northumberland	3,668	247,590	67.5	70,316	5,996	66,556	11.10	133,112
Ontario	2,016	131,040	65.0	37,215	4,334	42,170	9.73	84,340
Oxford	9,985	622,066	62.3	176,667	12,730	135,320	10.63	270,640
Parry Sound	86	3,268	38.0	928	88	880	10.00	1,760
Peel	183	9,150	50.0	2,599	3,289	32,298	9.82	64,596
Perth	616	33,880	55.0	9,622	6,083	70,989	11.67	141,978
Peterborough	415	20,045	48.3	5,693	2,753	25,685	9.33	51,370
Prescott	2,990	162,955	54.5	46,279	2,397	23,970	10.00	47,940
Prince Edward	6,560	367,360	56.0	104,330	4,033	26,618	6.60	53,236
Rainy River	14	560	40.0	159	10	50	5.00	100
Renfrew	825	33,000	40.0	9,372	2,886	31,429	10.89	62,858
Russell	1,262	66,886	53.0	18,996	2,708	33,850	10.50	67,700
Simcoe	1,346	67,300	50.0	19,113	3,197	31,746	9.93	63,492
Stormont	2,376	188,654	79.4	53,578	4,366	57,850	13.25	115,700
Thunder Bay	1	40	40.0	11	....	....	.....	....
Victoria	299	11,960	40.0	3,397	1,472	14,720	10.00	29,440
Waterloo	560	22,400	40.0	6,362	4,079	48,662	11.93	97,324
Welland	6,962	383,606	55.1	108,944	2,198	18,309	8.93	36.618
Wellington	131	5,240	40.0	1,488	2,615	29,340	11.22	58,680
Wentworth	1,800	106,560	59.2	30,263	4,740	40,148	8.47	80,296
York	682	38,669	56.7	10,982	6,127	69,541	11.35	139,082
The Province:								
1907	338,573	21,899,466	64.7	6,219,448	200,354	2,029,547	10.13	4,059,094
1906	289,456	23,988,682	82.9	9,019,744	180,796	2,149,413	11.89	4,298,826
1905	295,005	20,922,919	70.9	7,720,557	184,784	2,284,812	12.36	4,569,624
1904	329,882	20,241,914	61.4	7,570,476	193,115	2.023,340	10.48	4,046.680
1903	378,924	29,287,888	77.3	10,807,230	209,727	2,564,400	12.23	5.128,800
1902	371,959	20,512,194	55.1	8,327,951	209,859	2,611,334	12.44	5.222,668
1901	323,923	24,838,105	76.7	9,438,480	197.932	2,359.514	11.92	4,719,028
1900	330,772	27,093,561	81.9	8,588,659	179,798	2,147,532	11 94	4,295,064
1899	333,590	21,673,234	65.0	4,291,300	171,935	1,697,755	9.87	3,395.510
1898	330,748	23,442,593	70.9	4,711,961	189,948	2,128.073	11.20	4,256,146
1892-1907, 16 yrs.	309,035	21,814,602	70.6	6,425.779	172.171	1,964,886	11.41	3,929.772

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*The combined average area for corn for the twenty-six years 1882-1907 is 371,465 acres, the average value of theproduce for the same period being $7,797,497.

POTATOES AND TURNIPS.

TABLE XII.—Showing by County Municipalities of Ontario, the area, produce and market value of the crops of Potatoes and Turnips for the year 1907 together with the totals for the Province for the past ten years, and the average for the twenty-six years, 1882-1907; also the averages per acre.

Counties and Districts.	Potatoes.				Turnips.			
	Acres.	Bushels.	Per acre	Market value.	Acres.	Bushels.	Per acre.	Market value.
				$				$
Algoma	1,756	303,788	173	177,108	687	178,360	280	17,836
Brant	2,998	371,752	124	216,731	2,723	1,260,749	463	126,075
Bruce	4,420	424,320	96	247,378	6,791	1,480,438	218	148,044
Carleton	8,194	999,668	122	582,806	2,033	727,814	358	72,781
Dufferin	3,311	357,588	108	208,474	3,725	1,165,925	313	116,593
Dundas	2,206	238,248	108	138,899	56	26,208	468	2,621
Durham	3,460	480,940	139	280,388	5,033	2,727,886	542	272,789
Elgin	3,706	507,722	137	296,002	313	142,102	454	14,210
Essex	4,200	403,200	96	235,066	162	24,300	150	2,430
Frontenac	5,351	422,729	79	246,451	382	71,052	186	7,105
Glengarry	2,621	269,963	103	157,388	412	165,624	402	16,562
Grenville	2,949	330,288	112	192,558	151	50,283	333	5,028
Grey	6,084	638,820	105	372,432	9,170	2,264,990	247	226,499
Haldimand	1,719	165,024	96	96,209	64	18,560	290	1,856
Haliburton	711	63,990	90	37,306	182	49,322	271	4,932
Halton	1,739	177,378	102	103,411	1,175	562,825	479	56,283
Hastings	6,628	676,056	102	394,141	1,670	512,690	307	51,269
Huron	4,431	509,565	115	297,076	6,051	1,906,065	315	190,607
Kent	4,695	469,500	100	273,719	284	73,840	260	7,384
Lambton	3,778	385,356	102	224,663	264	83,688	317	8,369
Lanark	2,838	269,610	95	157,183	1,012	304,612	301	30,461
Leeds	3,236	307,420	95	179,226	518	153,846	297	15,385
Lennox & Addington	3,949	319,869	81	186,484	208	40,352	194	4,035
Lincoln	2,189	223,278	102	130,171	193	67,550	350	6,755
Manitoulin	738	140,220	190	81,748	250	100,000	400	10,000
Middlesex	7,553	861,042	114	501,987	2,451	1,205,892	492	120,589
Muskoka	1,420	147,680	104	86,097	538	185,072	344	18,507
Nipissing	1,719	281,916	164	164,357	481	112,073	233	11,207
Norfolk	3,780	412,020	109	240,208	979	368,104	376	36,810
Northumberland	5,048	696,624	138	406,132	4,235	2,210,670	522	221,067
Ontario	4,155	573,390	138	334,286	11,655	5,804,190	498	580,419
Oxford	3,393	386,802	114	225,506	6,142	2,677,912	436	267,791
Parry Sound	1,633	253,115	155	147,566	783	214,542	274	21,454
Peel	3,554	380,278	107	221,702	1,983	787,251	397	78,725
Perth	3,462	408,516	118	238,165	5,101	1,856,764	364	185,677
Peterborough	3,161	398,286	126	232,201	1,817	883,062	486	88,306
Prescott	3,410	562,650	165	328,025	352	90,464	257	9,046
Prince Edward	2,262	194,532	86	113,412	201	41,004	204	4,100
Rainy River	579	95,535	165	55,697	124	30,132	243	3,013
Renfrew	4,587	513,744	112	299,513	865	303,615	351	30,362
Russell	2,001	272,136	136	158,655	586	249,050	425	24,905
Simcoe	9,265	954,295	103	556,354	9,169	3,410,868	372	341,087
Stormont	2,053	246,360	120	143,628	64	32,384	506	3,238
Thunder Bay	626	109,550	175	63,868	111	27,750	250	2,775
Victoria	2,778	333,360	120	194,349	5,326	2,284,854	429	228,486
Waterloo	3,064	306,400	100	178,631	4,265	1,437,305	337	143,731
Welland	3,245	272,580	84	158,914	150	41,550	277	4,155
Wellington	4,459	557,375	125	324,950	12,252	5,611,416	458	561,142
Wentworth	5,083	579,462	114	337,826	2,063	816,948	396	81,695
York	6,989	803,735	115	468,578	7,859	3,363,652	428	336,365
The Province:								
1907	177,186	20,057,675	113	11,693,625	123,011	48,205,605	392	4,820,561
1906	136,064	15,020,299	110	8,080,921	132,512	57,060,151	431	5,706,015
1905	132,530	14,366,049	108	6,608,383	135,348	57,654,086	426	5,765,409
1904	133,819	15,479,122	116	7,847,915	133,207	64,861,703	487	6,486,170
1903	139,011	16,676,447	120	7,354,313	134,469	69,316,341	515	6,931,634
1902	144,733	12,942,502	89	7,312,514	136,725	71,740,204	525	7,174,020
1901	154,155	18,116,637	118	7,717,687	145,909	68,287,467	468	5,828,747
1900	163,754	21,476,439	131	5,605,351	156,583	59,330,395	379	5,933,040
1899	168,148	19,933,366	119	6,538,144	153,440	58,078,390	379	5,807,839
1898	169,946	14,358,625	84	6,332,154	151,601	64,727,882	427	6,472,788
1882-1907	156,244	17,922,896	115	7,506,370	127,519	55,111,354	432	5,511,135

OTHER FIELD ROOTS—HAY AND CLOVER.

TABLE XIII. Showing by County Municipalities of Ontario, the area, produce and market value of the crops of other Field Roots and Hay and Clover for the year 1907, together with the totals for the Province for the past ten years and the average for the twenty-six years 1882-1907 ; also the average per acre.

Counties and Districts.	Other field roots.				Hay and Clover.			
	Acres.	Bushels.	Per acre	Market value.	Acres.	Tons.	Per acre	Market value.
Algoma	199	59,700	300	$5,373	28,464	29,887	1.05	$451,592
Brant	1,755	982,800	560	88,452	35,915	55,668	1.55	841,143
Bruce	5,031	1,841,346	366	165,721	123,862	126,339	1.02	1,908,982
Carleton	1,416	555,072	392	49,956	87,391	98,752	1.13	1,492,143
Dufferin	1,059	421,482	398	37,933	54,915	64,800	1.18	979,128
Dundas	315	107,100	340	9,639	44,266	46,037	1.04	695,619
Durham	2,958	1,644,648	556	148,018	52,652	59,497	1.13	899,000
Elgin	878	439,000	500	39,510	71,528	100,854	1.41	1,523,904
Essex	1,581	513,825	325	46,244	52,854	83,509	1.58	1,261,821
Frontenac	656	179,088	273	16,118	104,197	84,400	.81	1,275,284
Glengarry	286	104,962	367	9,447	53,680	64,953	1.21	981,440
Grenville	351	107,406	306	9,667	46,373	37,098	.80	560,551
Grey	4,471	1,698,980	380	152,908	157,847	175,210	1.11	2,647,423
Haldimand	471	179,451	381	16,150	66,414	74,384	1.12	1,123,942
Haliburton	120	30,360	253	2,732	16,939	19,988	1.18	302,019
Halton	1,777	950,695	535	85,563	38,614	55,604	1.44	840,176
Hastings	722	231,040	320	20,794	111,426	98,055	.88	1,481.611
Huron	6,280	2,712,960	432	244,166	128,618	150,483	1.17	2,273,798
Kent	5,216	1,997,728	383	179,796	72,992	109,488	1.50	1,654,364
Lambton	2,771	1,177,675	425	105,991	96,482	122,532	1.27	1,851,459
Lanark	692	230,436	333	20,739	68,040	46,267	.68	699,094
Leeds	467	131,694	282	11,852	71,961	76,279	1.06	1,152,576
Lennox and Add	768	201,216	262	18,109	79,979	64,783	.81	978,871
Lincoln	629	274,244	436	24,682	49,745	67,653	1.36	1,022,237
Manitoulin	83	33,200	400	2.988	18,838	10,926	.58	165,092
Middlesex	3,279	1,695,243	517	152,572	120,026	172,837	1.44	2,611,567
Muskoka	279	83,700	300	7,533	29,674	30,564	1.03	461,822
Nipissing	222	66,600	300	5,994	23,950	27,303	1.14	412,548
Norfolk	1,001	443,443	443	39,910	54,499	75,754	1.39	1,144,643
Northumberland	1,545	766,320	496	68,969	67,104	67,104	1.00	1,013,941
Ontario	4,270	2,160,620	506	194,456	76,945	99,259	1.29	1,499,803
Oxford	3,713	1,882,491	507	169,424	80,617	123,344	1.53	1,863,728
Parry Sound	640	222,720	348	20,045	32,113	27,938	.87	422,143
Peel	1,791	843,561	471	75,920	55,806	79,245	1.42	1,197,392
Perth	5,471	2,412,711	441	217,144	98,801	143,261	1.45	2,164,674
Peterborough	1,536	638,976	416	57,508	51,736	48,632	.94	734,830
Prescott	325	117,000	360	10,530	63,544	93,410	1.47	1,411,425
Prince Edward	553	190,232	344	17,121	45,980	33,106	.72	500,232
Rainy River	100	30,000	300	2,700	11,263	17,796	1.58	268,898
Renfrew	630	269,010	427	24,211	96,351	102,132	1.06	1,543,215
Russell	399	159,600	400	14,364	38,258	57,387	1.50	867,118
Simcoe	3,475	1,355,250	390	121,973	119,853	130,640	1.09	1,973,970
Stormont	195	70,200	360	6,318	43,564	50,099	1.15	756,996
Thunder Bay	53	15,900	300	1,431	5,377	6,721	1.25	101,554
Victoria	1,388	567,692	409	51,092	61,968	75,601	1.22	1,142,331
Waterloo	4,405	2,039,515	463	183,556	53,533	80,300	1.50	1,213,333
Welland	220	81,620	371	7,346	59,717	65,689	1.10	992,561
Wellington	5,662	3,182,044	562	286,384	113,132	157,253	1.39	2,376,093
Wentworth	2,738	1,437,450	525	129,371	53,134	73,856	1.39	1,115,964
York	5,183	2,544,853	491	229,037	98,615	129,186	1.31	1,952,000
The Province :								
1907	*90,025	40,082,859	445	3,607,457	3,289,552	3,891,863	1.18	58,806,050
1906	74,332	34,461,890	464	2,828,892	3,069,917	4,684,625	1.53	42.630.087
1905	74,544	35,063,589	470	2,888,186	3,020,365	5,847,494	1.94	45,142.654
1904	77,978	35,618,385	457	2,940,503	2,926,207	5,259,189	1.80	41,915,736
1903	88,723	44,381,017	500	3,668,056	2,783,565	4,336,562	1.56	34.432.302
1902	85,178	42,368,085	497	3,534,669	2,646,202	4,955,438	1.87	40.386.820
1901	70,316	32,283,291	459	2,774,662	2,557,263	4,632,317	1.81	37,012.213
1900	64,863	28,197,648	435	2,411,922	2,526,566	3,133,045	1.24	26,568.222
1899	65,292	24,572,422	376	2,131,125	2,505.422	3,498,705	1.40	27,010.003
1898	60,341	26,271,425	435	2,295,838	2,453,503	4,399,063	1.79	27,362.172
1882-1907	50,075	21,977,034	439	1,923,649	2,532,638	3,711,957	1.47	33.655.240

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* Including sugar beets. Previous to 1907 the totals are for carrots and mangels.

ALL FIELD CROPS—ORCHARD AND VINEYARD—MIXED GRAINS.

TABLE XIV. Showing by County Municipalities for 1907 the aggregate area, the market value and the value per acre of all field crops enumerated in Tables VII and XIII, also the totals for the past ten years; the area in orchard, small fruits and vineyard, and the area and yield in mixed grains.

Counties and Districts.	All Field Crops.			Orchard, small fruits and Vineyard	Mixed Grains.		
	Area.	Value.	Per Acre		Acres.	Bushels.	Per Acre.
		$	$ c.	Acres.			
Algoma	47,369	847,712	17 90	713	910	21,567	23.7
Brant	122,287	2,611,586	21 36	5,194	6,090	209,496	34.4
Bruce	343,390	5,776,388	16 82	9,554	15,309	465,394	30.4
Carleton	229,330	4,320,050	18 84	3,028	12,953	487,033	37.6
Dufferin	173,741	3,037,639	17 48	3,234	10,145	313,481	30.9
Dundas	98,474	1,738,717	17 66	2,519	8,463	274,201	32.4
Durham	200,937	3,703,470	18 43	8,591	15,774	539,471	34.2
Elgin	222,306	4,345,758	19 55	10,379	10,246	307,380	30.0
Essex	259,201	4,801,850	18 53	10,307	5,819	182,717	31.4
Frontenac	191,655	2,537,814	13 24	4,576	5,259	105,180	20.0
Glengarry	118,386	2,123,227	17 94	2,222	2,526	75,780	30.0
Grenville	101,236	1,504,149	14 86	2,142	5,102	157,142	30.8
Grey	428,652	7,256,857	16 93	13,450	20,930	638,365	30.5
Haldimand	166,812	2,784,032	16 69	6,912	6,439	193,170	30.0
Haliburton	27,287	461,643	16 92	425	653	19,560	30.0
Halton	114,203	2,335,830	20 43	9,105	7,434	260,190	35.0
Hastings	268,202	3,871,733	14 44	10,812	5,814	134,885	23.2
Huron	384,945	6,996,985	18 18	13,552	22,628	735,410	32.5
Kent	353,584	6,929,727	19 60	14,388	10,795	341,122	31.6
Lambton	295,677	4,981,619	16 85	12,626	11,349	348,414	30.7
Lanark	146,067	1,803,157	12 34	2,286	8,980	239,766	26.7
Leeds	147,241	2,393,844	16 26	3,009	5,082	127,050	25.0
Lennox & Addington	164,769	2,112,363	12 82	4,920	4,555	109,320	24.0
Lincoln	111,441	2,053,449	18 43	15,401	2,119	61,875	29.2
Manitoulin	34,161	417,586	12 22	633	1,302	32,550	25.0
Middlesex	359,448	7,250,333	20 17	17,179	12,652	427,638	33.8
Muskoka	47,758	761,729	15 95	625	858	23,166	27.0
Nipissing	40,062	795,830	19 86	244	1,893	56,790	30.0
Norfolk	194,240	3,383,358	17 42	10,211	6,267	200,544	32.0
Northumberland	217,051	3,783,503	17 43	15,185	11,584	347,520	30.0
Ontario	259,456	5,386,113	20 76	7,989	21,965	777,561	35.4
Oxford	256,916	5,468,006	21 28	10,268	14,759	509,186	34.5
Parry Sound	55,404	843,095	15 22	347	1,350	31,860	23.6
Peel	183,803	3,624,615	19 72	6,687	4,944	162,163	32.8
Perth	300,652	6,110,891	20 33	7,452	14,582	498,704	34.2
Peterborough	165,990	2,820,319	17 00	3,215	3,320	99,600	30.0
Prescott	140,422	2,814,861	20 05	2,136	2,960	77,552	26.2
Prince Edward	121,591	1,499,649	12 33	11,766	3,196	92,364	28.9
Rainy River	16,650	418,838	25 16	63	103	4,120	40.0
Renfrew	234,124	3,738,782	15 97	1,718	5,416	162,480	30.0
Russell	87,123	1,814,282	20 82	1,052	2,736	98,496	36.0
Simcoe	451,710	7,949,329	17 60	12,056	18,725	539,280	28.8
Stormont	90,603	1,736,541	19 17	2,027	5,406	174,073	32.2
Thunder Bay	7,949	196,448	24 71	27	242	7,260	30.0
Victoria	201,357	3,547,462	17 62	3,427	11,339	360,580	31.8
Waterloo	183,347	3,892,734	21 23	5,576	23,037	771,740	33 5
Welland	133,360	2,132,560	15 99	9,376	3,118	82,315	26.4
Wellington	318,015	6,545,770	20 58	7,548	42,730	1,495,550	35.0
Wentworth	154,951	3,196,016	20 63	10,127	7,681	253,473	33.0
York	334,180	7,085,129	21 20	10,011	15,561	567,977	36.5
The Province:							
1907	9,307,515	168,543,378	18 11	326,290	*443,100	14,202,511	32.1
1906	8,962,925	144,570,075	16 13	365,091	....	....	.....
1905	8,897,898	142,804,431	16 05	380,332	....	....	.....
1904	8,673,525	134,304,690	15 48	383,852	....	....	.....
1903	8,731,405	136,657,807	15 65	381,120	....	....	.....
1902	8,677,988	146,421,171	16 87	370,279	....	....	.....
1901	8,667,512	128,325,648	14 81	359,142	....	....	.....
1900	8,794,953	114,758,761	13 05	350,098	....	....	.....
1899	8,753,926	105,771,321	12 08	348,875	....	....	.....
1898	8,835,272	110,528,947	12 51	345,538	....	....	.....
1882-1907	8,206,741	119,102,163	14 51	....	....	....	.....

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*Statistics for mixed grains were not taken previous to 1907 and the figures given are not included in all field crops.

RATIOS OF AREAS UNDER CROP.

TABLE XV.—Showing by County Municipalities of Ontario the number of acres under the various crops in 1907 per 1,000 acres of cleared land; together with the average for the Province for the past ten years, and the average of the twenty-six years, 1882-1907.

Counties and Districts.	Fall wheat.	Spring wheat.	Barley.	Oats.	Peas.	Beans.	Rye.	Buck-wheat.	Corn.	Potatoes.	Other field roots.	Hay and clover.	Mixed grains.
Algoma	3.7	7.7	24.8	201.1	41.3	.7	1.4	.5	1.0	30.4	14.5	492.4	15.7
Brant	125.3	.6	61.2	158.6	15.2	2.1	21.9	9.4	50.7	16.9	25.3	202.6	34.4
Bruce	58.7	2.7	37.8	199 2	55.1	.4	.7	2.3	9.0	8.0	21.3	223.0	27.5
Carleton	.3	16.3	24.2	292.5	5 6	1.1	.6	6.0	30.7	23.7	10.0	253.0	37.5
Dufferin	17.9	9.6	90.2	271.6	24.1	.1	7.6	10.2	1.6	12.9	18.7	214.7	39.7
Dundas	.7	1.6	21.9	219.8	1.8	.7	2.7	6.9	69.5	13.9	2.3	279.1	53.4
Durham	17.1	33.2	80.2	201.1	61.8	1.8	25.4	22.6	16.0	11.6	26.8	176.7	52.9
Elgin	82.7	1.0	36.4	147.4	18.2	26 0	9.8	7.2	92.2	10.7	3.4	206.4	29.6
Essex	34.9	2.3	32.3	253.6	9.8	1.3	3.2	4.1	281.1	13.0	5.4	164.2	18.1
Frontenac	2.3	13.3	30.4	186.2	6.1	1.1	2.6	4.6	24.7	18.0	3.5	348.8	17.6
Glengarry	......	15.8	31.8	231.1	2.4	.8	.1	5.0	26.9	13.4	3.6	274.6	12.9
Grenville	.2	2.4	14.1	200.4	1.0	.9	2.2	15.4	47.1	16.3	2.8	255.9	28.1
Grey	35.8	6.1	52.0	219.4	39.3	.4	.2	3.6	7.3	8.8	19.8	228.9	30.3
Haldimand	134.2	.8	38.4	173.1	38.4	1.3	3.0	5.5	24.2	7.3	2.3	283.5	27.5
Haliburton	......	5.9	16.0	174.1	15.5	.6	1.4	10.2	4.8	17.4	7.4	414.7	16.0
Halton	109.5	4.8	70.4	170.0	33.8	.3	.6	1.3	21.3	10.1	17.2	224.4	43.2
Hastings	5.6	5.6	65.5	199.5	15.2	1.0	7.0	9.3	33.4	15.3	5.5	258.0	13.5
Huron	53.5	3.1	50.0	211.5	34.3	.4	.3	2.6	13.9	6.9	19.0	198.5	34.9
Kent	93.3	2.2	74.0	175.7	9.6	51.7	1.6	4.0	171.8	10.1	11.9	157.6	23.3
Lambton	56.1	.5	62.2	215.8	8.5	2.8	.7	1.2	64.8	8.1	6.5	206.9	24.3
Lanark	2.1	19.3	20.9	146.5	6.5	.8	1.2	8.2	23.1	8.8	5.3	211 6	27.9
Leeds	3.0	6.3	18.8	178.9	2.4	.8	1.2	8.3	46.6	12.1	3.7	269.7	19.0
Lennox & Add	4.2	11.1	40.8	182.2	17.4	1.1	5.2	15.4	20.3	14.7	3.6	298.0	28.1
Lincoln	88.6	1.1	24.7	173.8	19.1	2.1	4.1	3.6	51.5	13.8	5.2	312.5	13.3
Manitoulin	7.8	22.3	33.2	157.5	86.0	.5	2.0	.6	8.7	16.5	7.5	421.1	29.1
Middlesex	71.3	.4	38.1	174.7	10.5	1.6	1.1	.8	47.8	11.6	8.8	183.9	19.4
Muskoka	.2	5.2	12.1	199.0	18.8	1.0	.1	1.3	10.0	22.2	12.8	464.0	13.4
Nipissing	1.4	10.5	15.7	191.6	38.6	.5	1.1	1.1	4.7	33.3	13.6	463.9	36.6
Norfolk	117.1	.2	27.2	156.9	28.2	3.1	43.1	38.0	80.9	14.0	7.3	201.2	23.1
Northumberland	23.3	12.9	64.7	188.5	44.6	2.7	20.9	22.2	28.4	14.8	17.0	196.9	34.0
Ontario	29.4	31.7	84.0	215.9	33.0	.6	8.9	22.3	17.3	11.4	43.5	209.9	59.9
Oxford	68.6	.3	52.7	214.8	12.2	.6	3.4	3.8	57.7	8.6	25.0	204.7	26.1
Parry Sound	......	5.8	15.4	208.9	34.1	1.2	.7	1.1	2.3	21.7	19.0	427.7	18.0
Peel	65.1	5.2	128.4	217.0	28.9	.9	3.5	4.2	13.4	13.8	14.6	215.9	19.1
Perth	74.3	1.6	67.0	236.6	24.9	.2	.1	.9	15.0	7.7	23.7	221.2	32.6
Peterborough	37.8	9.4	46.8	240.6	50.0	.4	5.3	12.4	12.2	12.2	12.9	199.2	12.8
Prescott	.6	21.6	31.8	267.5	5.6	1.6	....	4.7	26.6	16.8	3.3	314.2	14.6
Prince Edward	8.6	5.0	82.1	147.2	40 9	3.7	13.8	19.8	54.9	11.7	3.9	238.1	16.5
Rainy River	5.3	17.3	31.5	160.6	2.0	.4	.6	.2	1.1	27.7	10.7	538.1	4.9
Renfrew	.2	96.8	15.7	199.3	43.9	1.3	5.0	3.7	10.6	13.1	4.3	275.4	15.4
Russell	.3	15.0	30.5	278.0	6.9	1.4	....	5.0	31.9	16.1	7.9	307.7	22.0
Simcoe	100.2	9.7	106.6	219.2	31.5	.4	5.1	9.5	7.2	14 6	20.0	189.3	29.6
Stormont	.2	4.0	28.8	211.0	2.6	1.0	.7	11.3	46.1	14.0	1.8	297.8	37.0
Thunder Bay	.1	2.0	26.8	161.8	7.4	.5	2.4	....	.1	70.7	18.5	607.0	27.3
Victoria	20.7	25.8	71.0	269.7	31 6	1.1	3.2	28.3	6.2	9.8	23.7	218.3	40.0
Waterloo	118.3	.9	71.0	232 2	23.5	.1	2.0	1.2	18.4	12.1	34.3	211.9	91.2
Welland	113.5	.7	16.4	165.1	12.6	6.9	2.1	17.3	50.4	17.8	2.0	328.2	17.2
Wellington	21.5	11.3	69.6	233.7	22.3	.2	.9	6.8	5.6	9.1	36.5	230.5	87.0
Wentworth	115.2	1.5	56.3	198.7	19.1	.5	4.6	7.0	30.9	24.0	22.7	250.8	36.3
York	71.7	19.5	112.0	239.5	24.5	.5	3.2	6.5	15.6	16.0	29.8	225.6	35.6
The Province:													
1907	47.9	10.2	54.3	207.7	24.1	3.4	4.8	8 0	38.2	12.6	15.1	233.0	31.4
1906	55.8	12.2	53.6	192.6	29.1	3.6	5.7	7.5	33.3	9.7	14.7	217.6	......
1905	57.2	13.6	55.5	191.5	26.9	3.6	7.3	7.3	34.4	9.5	15.1	216.8	......
1904	43.8	16.3	55.9	192.2	24.6	3.7	9.5	7.3	37.9	9.7	15.3	211.9	......
1903	48.8	18.2	52.0	193.4	29.9	3.9	13.1	7.0	43.2	10.2	16.4	204.0	......
1902	55.2	22.3	48.8	184.3	39.2	4.0	13.9	6.9	42.9	10.7	16.3	195.0	......
1901	67.8	26.6	47.4	179.3	44.9	4.0	11.8	6.6	38.8	11.5	16.1	190.3	......
1900	80.4	28.3	43.4	180.4	49.8	3.3	10.7	7.7	38.4	12.3	16.7	190.0	......
1899	80.1	30.4	37.4	180.3	56.7	3.1	10.5	10.1	38.6	12.8	16.6	191.1	......
1898	80.7	30.0	33.8	182.9	66.6	3.4	12.7	11.5	40.1	13.1	16.4	188.8	......
1882–1907	70.4	32.7	52.5	173.4	52.3	3.4	9.6	8.1	30.1	12.7	14.4	205.1	......

MARKET PRICES.

TABLE XVI. The following table is compiled from thirty-four well distributed market points from quotations in the local press. The figures for the four months September-December, 1907, are also given, together with the average price for the past ten years, and the average for twenty-six years, 1882-1907.

Market and County.	Fall wheat, per bush.	Spring wheat, per bush.	Barley, per bush.	Oats, per bush.	Peas, per bush.	Beans, per bush.	Rye, per bush.	Buckwheat, per bush.	Corn (in ear) per bush.	Hay, per ton.	Potatoes, per bush.
						$ c.				$ c.	
Amherstburg, etc., Essex....	91.5	87.1	49.7	46.9	.....	......	......	......	25.9	10 34	42.4
Barrie, etc., Simcoe..........	92.9	87.5	62.9	48.3	78.1	......	64.0	......	25.3	17 01	53.9
Belleville, Hastings..........	89.4	75.0	48.0	57.5	75.0	......	65.0	57.6	......	20 18	65.7
Blenheim, etc., Kent	93.1	....	60.0	47.5	......	1 44	83.2	......	......	13 00	65.5
Bowmanville, etc., Durham..	94.9	88.1	67.1	46.7	81.3	.....	73.3	59.2	......	15 44	53 5
Bracebridge, Muskoka.......	....	....	....	52.0	77.5	......	......	......	......	14 50	75.6
Brampton, Peel...	95.2	83.8	66.3	46.5	82.7	......	74.2	......	......	17 65	55.5
Brantford, etc., Brant	94.2	91.3	61.2	49.8	73.4	......	73.0	56.9	27.1	15 06	58.5
Cornwall, Stormont	....	....	50.0	49.0	......	......	......	43.6	......	14 93	58.3
Dunnville, Haldimand.......	90.1	....	57.2	45.7	75.3	......	65.0	56.9	29.7	11 81	62.8
Forest, etc., Lambton	93.5	....	59.0	44.1	75.5	1 18	......	61.1	27.1	12 90	58.8
Galt, etc., Waterloo.........	93.6	....	63.1	50.4	78 9	......	68.2	58.5	30.3	14 15	63.3
Goderich, etc., Huron.......	91.1	88.6	56.1	44.4	78.1	......	45.0	50.9	29.1	13 78	57.6
Guelph, etc., Wellington....	91.5	80.1	57.9	46.0	76.5	......	70.0	58.8	27.9	12 55	56.0
Hamilton, etc., Wentworth..	93.7	....	65.6	53.1	78.4	......	78.0	60.5	30.6	15 26	66.7
Lindsay, Victoria	87.9	81.9	56.5	44.2	78.2	......	75.4	58.0	......	14 97	60.8
London, Middlesex..........	93.4	....	49.1	53.4	68.8	......	54.6	......	......	16 58	58.8
Oakville, Halton............	87.5	87.5	46.5	44.0	67.5	......	55.5	......	......	13 50	70.0
Orangeville, etc., Dufferin ...	90.4	88.4	57.9	47.3	78.5	......	72.8	53.9	......	14 85	63.2
Ottawa, Carleton............	....	....	....	51.7	......	......	......	......	......	19 77	52.8
Owen Sound, etc, Grey......	91.9	88.2	60.7	50.3	79.2	......	78.4	57.8	......	16 50	60.4
Pembroke, etc., Renfrew	99.8	....	57.0	46.2	80.1	1 56	62.1	55.0	......	16 84	51.0
Peterboro, etc., Peterboro....	90.2	85.1	58.8	47.7	81.9	......	67.9	57.1	......	16 65	56.2
Picton, Prince Edward	82.5	82.5	64.1	49.4	78.0	......	70.5	58.2	......	17 35	68.4
St. Catharines, Lincoln......	99.2	....	64.5	....	......	1 62	......	......	33.3	16 96	67.8
St. Thomas, Elgin	93.9	....	62.8	50.7	.....	......	......	......	27.5	15 06	67.0
Sault Ste Marie, etc., Algoma	95.0	....	52.5	53.0	72.6	2 00	......	......	......	18 25	57.3
Simcoe, Norfolk	88.1	....	57.5	45.6	76.3	......	69.8	54.6	27.8	13 06	48.3
Stratford, etc., Perth........	92.2	87.1	56.1	45.1	77.6	......	......	......	......	13 62	60.6
Toronto, etc., York..........	96.6	90.9	69.9	53.8	82.5	1 73	78.2	63.9	......	17 56	59.2
Uxbridge, Ontario...........	90.9	85.2	62.5	44.9	78.6	......	74.5	55.4	......	13 88	46.3
Walkerton, etc., Bruce	92.5	....	57.7	49.7	77.9	......	......	......	......	14 63	62.0
Welland, etc., Welland......	97.8	....	59.8	51.1	73.8	......	62.6	64.2	31.1	16 26	59.6
Woodstock, etc., Oxford.....	92.8	....	59.8	49.3	79.3	1 39	67.7	62.1	......	14 15	60.7
The Province:											
September..........	85.4	79.4	50.6	45.6	72.9	1 45	61.9	51.9	27.4	13 15	61.7
October	95.9	88.9	61.5	50.9	77.8	1 54	69.1	56.6	28.4	15 12	57.9
November	95.4	90.0	64.2	51.2	80.8	1 53	73.3	61.1	29.0	16 13	56.7
December	93.0	87.0	60.0	46.6	80.0	1 53	72.7	59.3	28.5	15 96	57.3
1907..................	92.7	86.4	59.4	48.8	78.0	1 52	69.4	57.4	28.4	15 11	58.3
1906..................	70.7	68.9	45.0	34.0	70.6	1 39	60.9	49.5	37.6	9 10	53.8
1905..................	76.5	74.9	42.9	33.6	65.3	1 32	56.8	50.0	36.9	7 72	46.0
1904..................	98.7	94.2	43.7	32.3	63.0	1 22	57.6	48.6	37.4	7 97	50.7
1903..................	75.1	74.4	42.1	29.3	64.3	1 41	48.6	44.3	36.9	7 94	44.1
1902.......	70.7	69.6	45.1	34.8	71.0	1 35	50.5	48.0	40.6	8 15	56.5
1901..................	66.1	66.8	45 0	36.2	65.3	1 25	49.3	48.4	38.0	7 99	42.6
1900..................	66.4	67.5	38.9	26.5	57.1	1 00	48.5	43.7	31.7	8 48	26.1
1899..........	66.7	66.5	39.5	27.7	57.3	1 08	50.0	45.5	19.8	7 72	32.8
1898..................	69.4	69.2	38 0	25.8	52.2	70	43.5	38.2	20.1	6 22	44.1
1882-1907 (26 years)	78.7	80.6	47.5	32.5	59.0	1 11	52.4	42.2	*29.5	9 07	41.9

*Average for sixteen years, 1892-1907.

HORSES AND CATTLE.

TABLE XVII. Showing by County Municipalities the number and value of Horses and Cattle on hand July 1, 1907, together with the totals for the Province for the past ten years.

Counties and Districts.	Horses, all ages.		Cattle.			
	Number.	Value.	Milch cows.	Other cattle.	Total cattle.	Value.
Algoma	3,399	$438,471	5,570	9,686	15,256	$367,432
Brant	9,076	1,016,512	13,249	18,994	32,243	898,263
Bruce	26,409	3,221,898	31,032	85,124	116,156	3,252,669
Carleton	17,123	2,140,375	38,300	47,051	85,351	2,247,765
Dufferin	12,753	1,492,101	14,274	35,129	49,403	1,251,817
Dundas	8,675	919,550	30,320	13,866	44,186	1,342,485
Durham	14,327	1,776,548	16,745	33,110	49,855	1,296,991
Elgin	18,926	2,119,712	28,330	44,683	73,013	2,157,546
Essex	21,929	2,302,545	20,312	35,135	55,447	1,359,753
Frontenac	14,228	1,479,712	39,193	32,051	71,244	1,851,852
Glengarry	10,159	1,066,695	30,239	18,122	48,361	1,266,382
Grenville	6,794	692,988	22,305	11,945	34,250	883,107
Grey	31,751	3,841,871	39,922	107,296	147,218	3,935,341
Haldimand	12,149	1,372,837	14,803	24,387	39,190	1,040,667
Haliburton	1,929	204,474	3,931	7,305	11,236	203,766
Halton	9,113	1,120,899	11,988	22,673	34,661	1,023,177
Hastings	19,458	2,043,090	52,643	43,247	95,890	2,131,741
Huron	33,022	4,358.904	33,831	101,991	135,822	4,139,405
Kent	28,295	3,055,860	25,366	56,914	82,280	2,355,174
Lambton	25,020	2,752,200	29,020	73,484	102,504	2,900,895
Lanark	11,726	1,348,490	27,352	40,295	67,647	1,593,961
Leeds	12,107	1,150,165	38,504	22,216	60,720	1,651,810
Lennox and Addington	12,401	1,240,100	27,919	29,585	57,504	1,315,089
Lincoln	9,072	1,043,280	10,734	12,802	23,536	643,245
Manitoulin	2,503	275,330	4,073	10,647	14,720	331,574
Middlesex	35,075	4,068,700	49,953	103,612	153,565	4,945,730
Muskoka	3,796	455,520	6,155	10,449	16,604	356,048
Nipissing	2,822	372,504	4,227	6,311	10,538	248,986
Norfolk	14,550	1,556,850	20,193	22,952	43,145	1,100,660
Northumberland	16,831	1,952,396	28,631	31,930	60,561	1,571,342
Ontario	20,128	2,536,128	23,531	51,336	74,867	2,172,304
Oxford	21,439	2,572,680	47,338	46,775	94,113	3,141,977
Parry Sound	3,837	464,277	6,276	12,534	18,810	398,126
Peel	13,286	1,753,752	16,373	29,100	45,473	1,462,595
Perth	25,123	3,265,990	35,413	72,054	107,467	3,010,907
Peterborough	12,139	1,335,290	22,110	30,848	52,958	1,149,110
Prescott	9,315	1,015,335	25,604	17,627	43,231	962,987
Prince Edward	9,792	988,992	17,855	12,956	30,811	854,628
Rainy River	991	128,830	1,508	2,710	4,218	106,697
Renfrew	14,386	1,755,092	28,184	52,225	80,409	1,764,483
Russell	6,600	765,600	18,485	14,931	33,416	800,817
Simcoe	33,894	4,338,432	38,643	85,089	123,732	2,941,741
Stormont	7,970	852,790	26,776	12,006	38.782	1,089,956
Thunder Bay	568	79,520	857	1,316	2,173	60.600
Victoria	14,233	1,707,960	19,979	44,612	64,591	1,541,324
Waterloo	14,577	1,749,240	17,058	28,374	45,432	1,286,309
Welland	9,505	1,074,065	10,987	15,542	26,529	702,232
Wellington	24,469	2,911,811	27,904	70,343	98,247	2,995,844
Wentworth	12,579	1,484,322	17,180	22,391	39,571	1,169,373
York	25,417	3,380,461	30,896	38,404	69,300	2,209,097
The Province:						
1907	725,666	85,041,144	1,152,071	1,774,165	2,926,236	79,485,780
1906	688,147	79,814,953	1,129,047	1,834,571	2,963,618	80,303,276
1905	672,781	73,911,177	1,106,984	1,782,519	2,889,503	76,764,482
1904	655,554	68,138,228	1,078,992	1,697,312	2,776,304	72,821,003
1903	639,581	61,811,456	1,050,108	1,624,153	2,674,261	69,289.924
1902	626,106	55,173,637	1,010,746	1,551,838	2,562,584	63,517.342
1901	620,343	50,038,465	984.012	1,523,608	2.507.620	59,527,119
1900	617,309	46,916,999	976,124	1,453,206	2,429,330	56,320,810
1899	615,524	42,713.557	974,474	1,343,881	2,318,355	52,938,500
1898	611,241	38,659,896	965,021	1,250,922	2,215.943	47,286.254

SHEEP, SWINE AND POULTRY.

TABLE XVIII. Showing by County Municipalities the numbers and values of Sheep, Swine and Poultry on hand on July 1, 1907, together with the totals for the Province for the past ten years :—

Counties and Districts.	Sheep and Lambs.		Swine.		Poultry, all classes.	
	Number.	Value.	Number.	Value.	Number.	Value.
Algoma	9,207	$41,155	5,379	$41,795	63,004	$25,202
Brant	11,429	78,289	31,210	225,336	160,598	67,451
Bruce	67,013	400,738	58,505	405,440	455,801	173,204
Carleton	23,368	111,933	33,566	236,976	311,420	140,139
Dufferin	30,452	152,260	35,711	247,120	189,329	71,945
Dundas	4,386	22,237	32,051	238,780	201,732	70,606
Durham	27,747	149,279	36,381	241,206	270,658	97,437
Elgin	28,098	162,125	78,249	485,144	431,656	151,080
Essex	15,039	75,496	138,676	1,002,627	564,509	174,998
Frontenac	22,101	110,726	28,868	219,397	212,241	84,896
Glengarry	7,971	40,971	19,913	150,542	155,018	55,806
Grenville	7,893	39,149	20,129	142,312	153,753	53,814
Grey	90,048	446,638	75,604	528,472	525,260	178,588
Haldimand	18,253	101,669	30,516	219,715	209,210	79,500
Haliburton	7,738	31,494	2,691	20,371	25,378	8,375
Halton	13,561	83,400	26,372	185,923	162,728	65,091
Hastings	37,564	156,642	57,201	453,032	331,033	115,862
Huron	40,443	249,938	69,556	473,676	684,726	225,960
Kent	19,056	101,759	132,558	817,883	678,899	230,826
Lambton	33,509	198,373	72,693	476,866	611,154	195,569
Lanark	32,260	158,074	22,515	153,552	179,903	61,167
Leeds	13,652	62,117	31,876	242,258	170,858	61,509
Lennox & Addington	16,231	90,407	27,161	201,535	215,885	75,560
Lincoln	11,305	70,091	19,391	140,973	164,585	65,834
Manitoulin	15,580	68,552	5,417	31,419	38,937	12,849
Middlesex	40,310	259,193	80,775	550,078	793,633	301,581
Muskoka	12,937	58,993	4,208	28,656	63,132	23,990
Nipissing	4,289	18,957	4,818	34,641	48,533	19,413
Norfolk	17,981	98,176	45,189	282,431	317,510	117,479
Northumberland	13,674	77,942	42,219	292,578	299,910	104,969
Ontario	37,953	223,923	83,432	403,025	329,964	122,087
Oxford	9,897	57,798	57,411	585,693	387,098	139,355
Parry Sound	14,893	69,401	5,998	44,325	60,863	21,302
Peel	14,715	93,735	32,229	229,470	224,279	96,440
Perth	19,006	111,185	71,775	505,296	469,128	159,504
Peterborough	16,076	72,985	31,529	202,416	224,499	83,065
Prescott	7,199	32,827	17,458	137,918	144,058	50,420
Prince Edward	7,986	36,336	19,077	140,216	156,292	54,702
Rainy River	1,271	6,991	1,481	10,308	20,657	7,437
Renfrew	61,522	250,395	24,821	178,463	231,940	83,498
Russell	4,938	26,517	17,339	125,188	114,968	42,538
Simcoe	65,849	326,611	97,575	655,704	551,062	192,872
Stormont	4,588	21,288	24,284	168,045	160,240	56,084
Thunder Bay	266	1,596	624	4,680	11,976	4,311
Victoria	27,163	133,642	37,757	251,839	259,371	88,186
Waterloo	13,793	80,689	53,237	379,047	223,163	73,644
Welland	10,029	53,755	16,436	123,270	193,363	67,677
Wellington	53,122	348,480	81,471	536,894	400,977	156,381
Wentworth	15,866	103,605	33,000	234,300	200,592	80,237
York	26,856	159,793	73,334	487,671	372,593	163,941
The Province :						
1907	1,106,083	5,928,325	2,049,666	14,174,502	13,428,076	4,854,381
1906	1,304,809	6,721,119	1,819,778	12,770,708	10,254,824	3,697,338
1905	1,324,153	6,191,774	1,906,460	12,280,667	9,738,493	3,335,660
1904	1,455,482	6,425,100	2,008,984	12,921,743	9,412,683	3,077,029
1903	1,642,627	7,228,498	1,977,386	13,023,743	9,683,573	2,973,646
1902	1,715,513	7,634,284	1,684,635	11,262,265	9,762,808	2,957,286
1901	1,761,799	7,772,793	1,491,885	9,298,712	9,745,236	2,859,172
1900	1,797,213	7,711,496	1,771,641	9,598,153	9,541,241	2,727,363
1899	1,772,604	7,315,729	1,971,070	10,180,338	9,344,024	2,658,321
1898	1,677,014	6,499,695	1,640,787	8,720,242	9,084,273	2,578,136

FARM PROPERTY, IMPLEMENTS AND LIVE STOCK

TABLE XIX.—Showing by County Municipalities of Ontario the value of farm lands, buildings, implements and live stock for the year 1907, together with the totals for the Province for the past ten years.

Counties and Districts.	Land	Buildings.	Implements.	Live Stock	Total.
	$	$	$	$	$
Algoma	2,939,212	894,957	347,236	914,055	5,095,460
Brant	8,409,800	4,468,000	1,183,300	2,285,851	16,346.951
Bruce	25,540,388	10,118,113	2,348,113	7,453,949	45,460,563
Carleton	20,962,500	7,420,000	1,881,750	4,877,188	35,141,438
Dufferin	11,608,388	4,273,763	1,076,693	3,215,243	20,174,087
Dundas	8,571,787	3,881,520	1,199,826	2,593,658	16,246,791
Durham	12,871,755	5,584,600	1,314,563	3,561,461	23,332,379
Elgin	16,983,000	7,587,438	1,752,347	5,075,607	31,398,392
Essex	17,638,456	6,683,880	1,989,141	4,915,419	31,226,896
Frontenac	11,310,000	4,742,786	1,454,571	3,746,583	21,253,940
Glengarry	9,351,966	4,270,000	1,086,008	2,580,396	17,288,370
Grenville	6,754,800	3,670,400	820,334	1,811,370	13,056,904
Grey	25,726,680	12,798,200	3,334,872	8,930,910	50,790,662
Haldimand	8,259,780	4,712,980	1,272,235	2,814,388	17,059,383
Haliburton	1,222,917	532,950	192,109	468,480	2,416,456
Halton	9,517,130	4,342,400	939,243	2,478,490	17,277,263
Hastings	18,234.150	6,918,575	2,152,365	4,900,367	32,205,457
Huron	29,570,185	12,754,880	2,899,122	9,447,883	54,672,070
Kent	26,186,309	10,137,864	2,908,709	6,561,502	45,794,384
Lambton	22,368,640	8,324,100	2,209,545	6,523,903	39,426,188
Lanark	11,819,600	4,058,760	1,133,184	3,315,244	20,326,788
Leeds	11,451,000	4,664,390	1,108,203	3,167,859	20,391,452
Lennox and Addington	10,098,000	5,000,000	1,298,333	2,922,691	19,319,024
Lincoln	9,466,470	4,710,960	1,114,009	1,963,423	17,254,862
Manitoulin	1,577,550	585,311	217,445	719,724	3,100,030
Middlesex	34,617,600	13,924,313	3,297,315	10,125,282	61,964,510
Muskoka	2,552,000	1,153,200	367,320	923,207	4,995,727
Nipissing	3,284,910	825,000	374,792	694,501	5,179,203
Norfolk	12,324,795	5,746,000	1,588,340	3,155,596	22,814,731
Northumberland	15,323,750	6,982,500	1,859,175	3,999,227	28,164,652
Ontario	18,278,825	7,501,333	1,914,106	5,457,467	33,151,731
Oxford	22,794,755	9,876,533	2,276,533	6,497,503	41,445,324
Parry Sound	2,228,814	1,049,017	384,324	997,431	4,659,586
Peel	13,172,320	6,431,400	1,270,485	3,635,992	24,510,197
Perth	23,395,200	9,938,188	2,431,288	7,052,882	42,817,558
Peterborough	12,374,000	3,985,740	1,119,655	2,842,866	20,322,261
Prescott	9,386,300	4,133,200	1,177,410	2,199,487	16,896,397
Prince Edward	7,749,869	3,609,525	942,650	2,074,874	14,376,918
Rainy River	1,275,399	300,295	101,178	260,263	1,937,135
Renfrew	12,897,360	5,336,000	1,686,496	4,031,931	23,951,787
Russell	6,967,800	3,036,220	734,839	1,760,660	12,499.519
Simcoe	30,436,200	12,847,830	3,188,577	8,455.360	54,927,967
Stormont	7,873,070	3,206,550	800,400	2,188,163	14,068,183
Thunder Bay	996,758	154,690	55,739	150,707	1,357,894
Victoria	13,551.450	4,537,750	1,325,030	3,722,951	23,137,181
Waterloo	12,675,390	6,439.600	1,518,562	3,568,929	24,202.481
Welland	9,685,824	4,117,005	986,254	2,020,999	16,810,082
Wellington	22,544,680	10,213,725	2,399,915	6,949,410	42,107.730
Wentworth	12,911,040	6,085,857	1,463,429	3,071,837	23.532.163
York	26,766,855	10,103,940	2,413,807	6,400,963	45,685,565
The Province					
1907	674,505,427	284,672,238	72,910,875	189,484,132	1,221,572,672
1906	661,199,920	273,414,187	71,197,619	183,307,394	1,189.119.120
1905	649,201,364	264,384,514	68,629,546	172,483.760	1,154,699.184
1904	640,544,541	257,995,484	65,992,210	163.383.103	1.127,915.338
1903	620,869,475	247,629,153	63,996,190	154,327,267	1,086.822.085
1902	604,860,063	237,289,668	62,199,787	140,544,814	1.044.894.332
1901	585,354,294	226,575,228	59,897,513	129,496,261	1,001.323.296
1900	574,727,610	219,488,370	57,324,130	123,274,821	974.814.931
1899	563,271,777	213,440,281	54,994,857	115,806.445	947.513.360
1898	556,246,569	210,054.396	52,977,232	103.744.223	923.022.420

FARM VALUES PER ACRE.

TABLE XX.—Showing by County Municipalities of Ontario, average values per acre of farm property in 1907, together with the average for the Province for the past ten years.

Counties and Districts.	Farm values, average per acre occupied.					Value buildings, implements and live stock, per acre cleared.
	Land.	Buildings.	Implements.	Live stock.	Total.	
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Algoma	6 19	1 88	73	1 92	10 72	37 30
Brant	38 90	20 67	5 47	10 57	75 61	44 78
Bruce	27 73	10 99	2 55	8 09	49 36	35 86
Carleton	37 17	13 16	3 33	8 65	62 31	41 06
Dufferin	32 55	11 98	3 02	9 01	56 56	33 49
Dundas	36 16	16 37	5 06	10 94	68 53	48 40
Durham	34 72	15 06	3 54	9 61	62 93	35 10
Elgin	38 85	17 35	4 01	11 61	71 82	41 60
Essex	41 30	15 65	4 66	11 51	73 12	42 21
Frontenac	16 28	6 83	2 09	5 39	30 59	33 29
Glengarry	32 49	14 84	3 77	8 96	60 06	40 59
Grenville	24 79	13 47	3 01	6 65	47 92	34 77
Grey	24 14	12 01	3 13	8 38	47 66	36 34
Haldimand	29 50	16 83	4 54	10 05	60 92	37 56
Haliburton	2 10	92	33	81	4 16	29 22
Halton	42 59	19 43	4 20	11 09	77 31	45 10
Hastings	17 08	6 48	2 02	4 59	30 17	32 35
Huron	37 05	15 98	3 63	11 84	68 50	38 73
Kent	46 07	17 83	5 12	11 54	80 56	42 34
Lambton	34 05	12 67	3 37	9 93	60 02	36 58
Lanark	17 29	5 93	1 66	4 85	29 73	20 24
Leeds	24 44	9 96	2 36	6 76	43 52	33 51
Lennox and Addington	22 75	11 26	2 93	6 58	43 52	34 36
Lincoln	49 73	24 75	5 85	10 32	90 65	48 93
Manitoulin	5 95	2 21	82	2 72	11 70	36 48
Middlesex	45 69	18 38	4 35	13 36	81 78	41 89
Muskoka	4 59	2 07	66	1 66	8 98	38 21
Nipissing	5 88	1 48	67	1 24	9 27	36 69
Norfolk	30 91	14 41	3 98	7 92	57 22	38 73
Northumberland	35 18	16 03	4 27	9 18	64 66	37 68
Ontario	36 25	14 88	3 80	10 82	65 75	40 58
Oxford	48 32	20 94	4 83	13 77	87 86	47 36
Parry Sound	3 72	1 75	64	1 67	7 78	32 38
Peel	45 65	22 29	4 40	12 60	84 94	43 85
Perth	45 13	19 17	4 69	13 61	82 60	43 49
Peterborough	21 54	6 94	1 95	4 95	35 38	30 61
Prescott	32 19	14 17	4 04	7 54	57 94	37 13
Prince Edward	33 20	15 46	4 04	8 89	61 59	34 32
Rainy River	4 64	1 09	37	95	7 05	31 62
Renfrew	12 56	5 19	1 64	3 93	23 32	31 60
Russell	27 80	12 11	2 93	7 02	49 86	44 49
Simcoe	31 40	13 25	3 29	8 72	56 66	38 68
Stormont	31 86	12 97	3 24	8 85	56 92	42 35
Thunder Bay	3 19	50	18	48	4 35	40 76
Victoria	22 60	7 57	2 21	6 21	38 59	33 78
Waterloo	41 32	20 99	4 95	11 63	78 89	45 64
Welland	42 59	18 11	4 34	8 88	73 92	39 16
Wellington	35 87	16 25	3 82	11 06	67 00	39 86
Wentworth	47 68	22 48	5 40	11 35	86 91	50 13
York	49 84	18 81	4 49	11 92	85 06	43 28
The Province:						
1907	27 65	11 67	2 99	7 77	50 08	38 75
1906	27 23	11 26	2 93	7 55	48 97	37 42
1905	26 84	10 92	2 84	7 14	47 74	36 28
1904	26 53	10 69	2 73	6 77	46 72	35 29
1903	25 95	10 35	2 67	6 45	45 42	34 15
1902	25 49	10 00	2 62	5 93	44 04	32 43
1901	24 76	9 59	2 53	5 48	42 36	30 96
1900	24 37	9 31	2 43	5 23	41 34	30 09
1899	24 02	9 10	2 34	4 94	40 40	29 31
1898	23 78	8 98	2 26	4 44	39 46	28 33

CHEESE FACTORIES.

TABLE XXI.—Showing by county Municipalities of Ontario the number of cheese factories in operation, the quantity and value of cheese made, the number of patrons, the milk required to make one lb. of cheese, and the value of cheese per lb., at the factories in 1906, together with the totals for the Province for the past ten years.

Counties and Districts.	Factories in operation.	Quantity of—		Gross value of cheese.	Average number of patrons.	Milk to make one lb. of cheese.	Value of cheese per lb.
		Milk used	Cheese made.				
		lbs.	lbs.	$		lbs.	cts.
Brant	8	13,852,241	1,249,815	145,877	579	11.08	11.67
Bruce	10	8,011,786	730,599	86,228	616	10.97	11.80
Carleton	71	72,633,936	6,753,436	802,361	2,678	10.76	11.88
Dufferin	5	4,168,290	391,294	44,932	270	10.65	11.48
Dundas	77	107,441,007	10,104,526	1,189,811	2,243	10.63	11.78
Durham	11	10,135,382	924,724	111,237	740	10.96	12.03
Elgin	22	53,835,116	4,948,702	576,876	1,834	10.88	11.66
Essex	1	750,000	68,200	8,200	45	11.00	12.02
Frontenac	52	101,285,178	9,498,124	1,123,030	2,606	10.66	11.82
Glengarry	78	68,334,231	6,450,847	758,421	2,246	10.59	11.76
Grenville	49	64,252,892	5,980,764	711,507	2,036	10.74	11.90
Haldimand	9	11,969,829	1,094,831	128,052	811	10.93	11.70
Haliburton	2	1,082,615	103,187	12,175	59	10.49	11.80
Hastings	94	141,505,931	13,252,196	1,553,494	3,995	10.68	11.72
Huron	5	5,395,318	486,760	57,812	358	11.08	11.88
Lambton	13	14,475,547	1,350,272	158,914	1,171	10.72	11.77
Lanark	46	61,779,206	5,716,724	686,545	2,355	10.81	12.01
Leeds	106	152,081,406	14,100,507	1,664,421	3,284	10.79	11.80
Lennox and Addington	34	73,546,441	6,986,972	821,669	2,462	10.53	11.76
Lincoln	5	6,195,964	583,227	68,669	460	10.62	11.77
Middlesex	38	69,634,981	6,403,701	749,579	2,230	10.87	11.71
Muskoka and Nipissing	3	376,603	35,665	4,365	44	10.56	12.24
Norfolk	22	37,004,800	3,359,746	394,274	2,148	11.01	11.74
Northumberland	44	69,651,348	6,348,181	746,719	2,629	10.97	11.76
Oxford	47	132,137,806	12,074,378	1,412,574	3,338	10.94	11.70
Peel	2	1,346,031	128,305	15,022	35	10.49	11.71
Perth	25	47,243,934	4,317,966	517,214	2,178	10.94	11.98
Peterborough	41	45,161,540	4,113,533	492,484	1,911	10.98	11.97
Prescott	86	61,823,743	5,926,236	700,976	2,496	10.43	11.83
Prince Edward	23	55,098,597	5,152,902	609,619	1,881	10.69	11.83
Renfrew	26	20,325,237	1,889,298	227,055	1,293	10.76	12.02
Russell	74	54,644,657	5,211,953	601,605	2,083	10.48	11.54
Simcoe and Grey	8	4,164,369	387,507	46,638	379	10.75	12.04
Stormont	60	77,732,354	7,295,474	865,435	2,166	10.65	11.86
Victoria	16	16,552,754	1,504,682	180,997	963	11.00	12.03
Waterloo	6	6,507,298	602,599	68,270	380	10.80	11.33
Welland	2	2,368,695	220,815	26,303	177	10.73	11.91
Wellington	8	10,379,134	951,095	113,885	576	10.91	11.97
Wentworth	5	6,085,900	565,966	67,035	345	10.75	11.84
York	3	1,619,765	152,430	18,927	93	10.63	12.42
The Province:							
1906	1,237	1,692,591,862	157,418,139	18,569,207	58,193	10.75	11.80
1905	1,198	1,741,534,876	164,866,223	17,417,757	56,960	10.50	10.56
1904	1,141	1,639,121,124	154,879,438	12,908,118	57,485	10.58	8.33
1903	1,126	1,734,676,167	165,306,573	17,203,233	57,102	10.49	10.41
1902	1,127	1,537,532,591	146,805,776	14,792,924	55,843	10.41	10.08
1901	1,167	1,434,540,520	134,942,517	12,269,073	59,377	10.63	9.09
1900	1,173	1,366,433,199	127,789,543	13,023,025	59,294	10.69	10.19
1899	1,203	1,311,530,927	123,323,923	12,120,887	60,443	10.63	9.83
1898	1,187	1,374,399,482	128,116,924	10,252,240	65,121	10.73	8.00
1897	1,161	1,455,937,148	137,362,916	11,719,468	66,104	10.60	8.53

AGRICULTURAL STATISTICS OF THE UNITED STATES.

WHEAT.

Year.	Acres.	Bushels.	Average yield per acre.	Total value.
				$
1907	45,211,000	634,087,000	14.0	554,437,000
1906	47,305,829	735,260,970	15.5	490,332,760
1905	47,854,079	692,979,489	14.5	518,372,727
1904	44,074,875	552,399,517	12.5	510,489,874
1903	49,464,967	637,821,835	12.9	443,024,826
1902	46,202,424	670,063,008	14.5	422,224,117
1901	49,895,514	748,460,218	15.0	467,350,156
1900	42,495,385	522,229,505	12.3	323,525,177
1899	44,592,516	547,303,846	12.3	319,545,259
1898	44,055,278	675,148,705	15.3	392,770,320
1897	39,465,066	530,149,138	13.4	428,547,121
1896	34,618,646	427,684,346	12.4	310,602,539
1895	34,047,332	467,102,947	13.7	237,938,998
1894	34,884,436	460,267,416	13.2	225,902,025
1893	34,629,418	396,131,725	11.4	213,171,381
1892	38,554,430	515,949,000	13.4	322,111,881
1891	39,916,897	611,780,000	15.3	513,472,711

CORN.

Year.	Acres.	Bushels.	Average yield per acre.	Total value.
				$
1907	99,931,000	2,592,320,000	25.9	1,336,901,000
1906	96,737,581	2,927,416,091	30.3	1,166,626,479
1905	94,011,369	2,707,993,540	28.8	1,116,696,738
1904	92,231,581	2,467,480,934	26.8	1,087,461,440
1903	88,091,993	2,244,176,925	25.5	952,868,801
1902	94,043,613	2,523,648,312	26.8	1,017,017,349
1901	91,349,928	1,522,519,891	16.7	921,555,763
1900	83,320,872	2,105,102,526	25.3	751,220,034
1899	82,108,587	2,078,143,933	25.3	629,210,110
1898	77,721,781	1,924,184,660	24.8	552,023,428
1897	80,095,051	1,902,967,933	23.8	501,072,952
1896	81,027,156	2,283,875,165	28.2	491,006,967
1895	82,075,830	2,151,138,580	26.2	544,985,534
1894	62,582,269	1,212,770,052	19 4	554,719,162
1893	72,036,465	1,619,496,131	22.5	591,625,627
1892	70,626,658	1,628,464,000	23.1	642,146,630
1891	76,204,515	2,060,154,000	27.0	836,439,228
1881	64,262,025	1,194,916,000	18.6	759,482,170

OTHER CROPS.

—	1907.		1906.		1905.	
	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.
Oats	31,837,000	754,443,000	30,958,768	964,904,522	28,046,746	953,216,197
Barley	6,448,000	153,597,000	6,323,757	178,916,484	5,095,528	136,651,020
Rye	1,926,000	31,566,000	2,001,904	33,374,833	1,730,159	28,485,952
Buckwheat	800,000	14,290,000	789,208	14,641,937	760,118	14,585,082

Figures for United States are in Winchester bushels.

CROPS IN THE NORTHWEST PROVINCES OF CANADA.

Year.	Wheat.		Oats.		Barley.		Flax.	
	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.
Alberta.								
1902........	45,064	850,122	118,997	3,776,976	22,201	473,108	373	4,476
1903........	63,391	1,200,598	162,314	5,187,511	42,219	1,077,274	830	7,753
1904........	55,707	938,200	180,698	5,609,496	61,549	1,608,241	367	5,003
1905........	107,527	2,306,524	242,801	9,514,180	64,830	1,773,914	581	8,337
1906........	177,127	3,966,020	335,728	13,136,913	73,588	2,157,957	3,647	38,491
1907........	207,900	4,194,535	307,093	9,247,914	54,698	1,082,460	6,488	50,002
Saskatchewan								
1902........	580,860	13,110,330	193,200	6,975,796	14,275	298,632	16,694	153,709
1903........	777,822	15,121,015	280,096	9,164,007	27,679	665,593	31,644	285,697
1904........	910,359	15,944,730	346,530	10,756,350	24,650	698,336	15,917	166,434
1905........	1,130,084	26,107,286	449,936	19,213,055	32,946	893,396	25,315	398,399
1906........	1,730,586	37,040,098	639,893	23,965,528	53,565	1,316,415	76,005	710,689
1907........	1,971,099	27,691,601	744,187	23,324,903	77,120	1,350,265	125,029	1,364,716
Manitoba.								
1889........	623,245	7,201,519	218,744	3,415,104	80,238	1,051,551	....	....
1890........	746,058	14,655,769	235,534	9,513,443	60,035	2,069,415	....	....
1891........	916,614	23,191,599	305,644	14,752,605	89,828	3,107,876	....	....
1892........	875,990	14,453,835	332,974	11,654,090	97,644	2,831,676	....	....
1893........	1,003,640	15,615,923	388,529	9,823,935	114,762	2,547,653	9,737	116,454
1894........	1,010,186	17,172,883	413,686	11,907,854	119,528	2,981,716	30,500	336,000
1895........	1,140,276	32,775,038	482,653	22,555,733	153,839	5,645,036	....	1,281,354
1896........	099,598	14,371,806	442,445	12,502,318	127,885	3,171,747	....	259,143
1897........	1,290,882	18,261,950	468,141	10,629,513	153,266	3,183,602	....	247,836
1898........	1,488,232	25,313,745	514,824	17,308,252	158,058	4,277,927	....	350,000
1899........	1,629,995	27,922,230	575,136	22,318,378	182,912	5,379,156	21,780	304,420
1900........	1,457,396	13,025,252	429,108	8,814,312	155,111	2,939,477	20,437	164,313
1901........	2,011,835	50,502,085	689,951	27,796,588	191,009	6,536,155	20,978	266,420
1902........	2,039,940	53,077,267	725,060	34,478,160	329,790	11,848,422	41,200	564,440
1903........	2,442,873	40,116,878	855,431	33,035 774	326,537	8,707,252	55,900	586,950
1904........	2,412,235	39,162,458	943,574	36,289,979	361,004	11,177,970	35,428	464,106
1905........	2,643,588	55,761,417	1,031,239	45,484,025	432,298	14,064,176	24,770	326,964
1906........	3,141,537	61,250,413	1,155,961	50,692,978	474,242	17,532,554	18,790	274,330
1907........	2,789,553	39,688,266	1,213,596	42,140,744	649,570	16,752,724	25,915	317,347

OTHER CROPS IN MANITOBA.

Year.	Rye.		Peas.		Potatoes.		Roots.	
	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.
1893.........	2,229	29,422	....	....	....	1,649,385	20,919	3,896,798
1894.........	....	59,924	....	18,434	....	2,035,336	7,880	1,841,942
1895.........	....	81,082	....	28,229	16,716	4,042,562	6,785	2,285,283
1896.........	....	52,255	....	23,383	12,260	1,962,490	6,715	1,898,805
1897.........	....	48,344	....	33,380	13,576	2,033,298	6,130	1,220,070
1898.........	....	63,860	....	31,880	19,781	3,253,038	8,448	2,471,715
1899.........	3,217	64,340	1,366	20,490	19,151	3,226,395	10,079	2,670,108
1900.........	2,480	25,792	780	9,048	16,880	2,226,880	7,482	1,452,780
1901.........	2,707	62,261	879	16,349	24,429	4,797,433	10,214	2,925,362
1902.........	2,559	49,900	1,596	34,154	22,005	3,459,325	12,175	3,230,995
1903.........	4,899	88,182	2,357	41,483	27,198	4,757,000	12,251	3,452,340
1904.........	6,293	125,860	2,562	51,240	24,471	3,799,569	14,870	3,741,580
1905.........	6,923	173,075	2,081	53,706	25,835	4,759,646	13,411	3,481,653
1906.........	4,195	100,680	2,550	67,302	25,043	4,702,595	13,001	3,446,432
1907.........	6,029	83,681	1,684	27,521	32,388	5,092,161	9,877	2,514,291

Canadian figures are given in Imperial bushels.

PART II.—CHATTEL MORTGAGES.

Table showing by County Municipalities of Ontario the total number and amount of Chattel Mortgages on record and undischarged on December 31st, 1907, against (1) all occupations, (2) farmers; together with totals for the Provinces for the past ten years.

Counties and Districts.	Chattel Mortgages against all occupations.				Chattel Mortgages against farmers.			
	To secure existing debt.		For future indorsation.		To secure existing debt.		For future indorsation.	
	No.	Amount.	No.	Amount.	No.	Amount.	No.	Am'nt.
		$		$		$		$
Algoma	238	*2,092,370	3	15,656	126	35,665	1	89
Brant	221	127,177	....	....	84	61,004	....	......
Bruce	407	182,344	....	....	264	85,370	....	......
Carleton	525	708,928	7	9,201	65	30,792	1	100
Dufferin	112	46,599	....	....	77	32,857	....	......
Elgin	445	256,517	....	....	199	69,935	....	......
Essex	551	508,429	1	3,500	220	69,575	....	......
Frontenac	350	209,395	....	....	260	71,945	....	......
Grey	535	202,392	2	205	365	116,215	....	......
Haldimand	115	67,099	....	....	74	30,996	....	......
Haliburton	58	20,217	2	781	53	9,997	2	781
Halton	74	124,233	....	....	28	10,210	....	......
Hastings	451	422,583	‖14	1,003,371	328	85,462	6	1,645
Huron	241	435,352	....	....	142	93,401	....	......
Kent	899	608,410	2	233	712	205,443	2	233
Lambton	532	217,402	....	....	324	100,065	....	......
Lanark	115	581,314	....	....	53	14,347	....	......
Leeds and Grenville	261	125,674	....	....	184	83,612	....	......
Lennox and Addington	189	105,150	2	199	107	67,978	1	74
Lincoln	139	111,296	3	440	51	17,230	....	......
Manitoulin	70	32,150	1	2,500	40	10,838	....	......
Middlesex	364	241,743	....	....	92	43,215	....	......
Muskoka	185	115.102	1	400	87	14,901	....	......
Nipissing	487	†2,793,645	4	12,145	182	60,338	....	......
Norfolk	216	61,977	....	....	148	38,037	....	......
Northumberland and Durham	412	279,786	....	....	248	111,421	....	......
Ontario	243	228,837	....	....	163	101,669	....	......
Oxford	201	179,419	2	2,300	90	39,478	2	2,300
Parry Sound	182	391,074	3	4,431	124	24,929	1	250
Peel	77	88,168	....	....	48	21,744	....	......
Perth	163	116,072	....	....	69	49,282	....	......
Peterborough	217	165,543	....	....	114	54,783	....	......
Prescott and Russell	132	314,155	....	....	80	35,688	....	......
Prince Edward	113	297,596	2	386	89	18,784	1	300
Rainy River	84	234,849	....	....	23	5,813	....	......
Renfrew	233	133,871	....	....	160	65,289	....	......
Simcoe	416	688,245	....	....	252	140,434	....	......
Stormont, Dundas & Glengarry	238	120,259	25	13,017	149	60,756	9	3,999
Thunder Bay	87	236,371	1	700	12	6,108	....	......
Victoria	145	70,571	....	....	100	39,910	....	......
Waterloo	170	138,743	2	550	39	34,377	....	......
Welland	233	§4,523,509	6	16,229	56	11,341	....	......
Wellington	230	142,641	....	....	89	44,517	....	......
Wentworth	566	362,109	11	36,393	120	51,676	5	3,244
York	1,244	‡3,184,902	15	49,843	148	65,162	....	...
The Province.								
1907	13,166	22,294,218	109	1,172,480	6,438	2,442,589	31	13,015
1906	14,640	14,927,312	97	416,520	6,993	2,709,016	25	7,614
1905	16,355	17,218,030	96	1,154,328	7,403	2,758,046	29	10,344
1904	15,568	13,656.740	94	472,761	7,100	2,559,195	42	25,034
1903	14,885	14,354,605	187	491,978	7,085	2 548.758	88	19.446
1902	15,684	10,890,615	142	1,099,188	7,193	2,616,538	42	21,387
1901	16,299	10,613,564	247	237,445	7,757	2,854,759	134	30.207
1900	17,321	11,669,806	307	499,184	8,440	3,110,543	121	39.840
1899	18,216	11,067,664	291	324,628	9,392	2,988,853	124	34,798
1898	19.526	12,001,075	283	281,142	10,514	3,547,554	117	32.943

*Including 1 Iron & Steel Co., for $1,500,000 and 14 Lumbermen for $372,542. †Including 1 Pulp Mill for $2,000,000 and 9 Lumbermen for $350,622. § Including 1 Manufacturer for $2,000,000, 3 Construction Cos. for $1,202,631 and 1 Cement Co for $1,000,000. ‡ Including 205 Hotels for $1,048,382. ‖ Including 1 Manufacturer for $1,000,000.

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